FINAL SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT (SLERA) FOR THE GULFCO MARINE MAINTENANCE SUPERFUND SITE FREEPORT, TEXAS

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LIST OF ACRONYMS

AET – apparent effects threshold

AST – aboveground storage tank

AUF – area-use factor (unitless)

BAF – bioaccumulation factor

BCF – bioconcentration factor

BERA – Baseline Ecological Risk Assessment

BSAF – biota-sediment accumulation factor

BW – wildlife receptor body weight (kg)

COI – chemicals of interest

COPEC – chemicals of potential ecological concern

CSM – conceptual site model

DDD – dichlorodiphenyldichloroethylene

DDE – dichlorodiphenyldichloroethane

DDT – dichlorodiphenyltrichloroethane

EPA – United States Environmental Protection Agency

EPC – exposure point concentration

ERA – Ecological Risk Assessment

ERL – effects range low

ERM – effects range medium

HPAH – high-molecular weight polynuclear aromatic hydrocarbon

HQ – hazard quotient

LOAEL – lowest observed effects level

LPAH – low-molecular weight polynuclear aromatic hydrocarbon

NEDR – Nature and Extent Data Report

NOAEL – no observed adverse effects level

NPL – National Priorities List

PAH – polynuclear aromatic hydrocarbon

PCB – polychlorinated biphenyl

PCL – Protective Concentration Limit

QAPP – Quality Assurance Project Plan

RI/FS – Remedial investigation/Feasibility Study

ROPC – receptors of potential concern

SLERA – Screening-Level Ecological Risk Assessment

SMDP – Scientific Management Decision Point

SOW – Statement of Work

TCEQ – Texas Commission on Environmental Quality

TDSHS – Texas Department of State Health Services

TPWD – Texas Parks and Wildlife Department

TRV – species-specific toxicity reference value

TRRP – Texas Risk Reduction Program

TSWQS – Texas Surface Water Quality Standard

UAO – Unilateral Administrative Order

UCL – upper confidence limit

USDA – United States Department of Agriculture

USFWS – United States Fish and Wildlife Service

EXECUTIVE SUMMARY

The purpose and scope of this document is to summarize the analytical data for environmental media sampled during the Remedial Investigation (RI) and to conduct an updated Screening-Level Ecological Risk Assessment (SLERA) based on those data for the Gulfco Marine Maintenance Superfund Site located in Freeport, Texas in Brazoria County at 906 Marlin Avenue. The SLERA is a conservative assessment and serves to evaluate the need and, if required, the level of effort necessary to conduct a baseline ecological risk assessment. Per the United States Environmental Protection Agency (EPA) guidance, the SLERA provides a general indication of the potential for ecological risk (or lack thereof) and may be conducted for several purposes including: 1) to estimate the likelihood that a particular ecological risk exists; 2) to identify the need for site-specific data collection efforts; or 3) to focus site-specific ecological risk assessments where warranted.

The Site consists of approximately 40 acres within the 100-year coastal floodplain along the north bank of the Intracoastal Waterway between Oyster Creek to the east and the Old Brazos River Channel to the west. Beginning in approximately 1971, barges were brought to the facility and cleaned of waste oils, caustics and organic chemicals, with these products reportedly stored in on-site tanks and later sold. Sandblasting and other barge repair/refurbishing activities also occurred on the Site. During the operation, wash waters were reportedly stored either on a floating barge, in on-site storage tanks, and/or in surface impoundments present on Lot 56 of the Site. The surface impoundments were closed under the Texas Water Commission’s direction in 1982.

The South Area includes approximately 20 acres of upland that were created from dredged material from the Intracoastal Waterway. Prior to construction of the Intracoastal Waterway, this area was most likely coastal wetlands. The North Area, excluding the capped surface impoundments and access roads, is considered estuarine wetland. The North Area consists of approximately five acres of upland, which supports a variety of herbaceous vegetation that is tolerant of drier soil conditions, while the North wetlands is approximately 15 acres in size.

Data related to the nature and extent of potential contamination in ecologically-relevant media (e.g., soil, sediment, and surface water) at the Site were obtained as part of the RI. Unless otherwise noted, the samples were analyzed for the full suite of analytes as specified in the approved Remedial Investigation/Feasibility Study Work Plan for the Site. Samples included:

- Eighty-three surface soil samples (0 to 0.5 ft below ground surface) and 83 subsurface soil samples (0.5 ft to 4 ft below ground surface) were collected in the South Area.
- Eighteen surface soil and subsurface soil samples were collected in the North Area.
- Two additional surface soil samples were collected near the former transformer shed at the South Area for polychlorinated biphenyls analyses only.
- Ten background soil samples were collected within the approved background area approximately 2,000 feet east of the Site near the east end of Marlin Avenue.
- Sixteen sediment samples were collected from the Intracoastal Waterway in front of the Site. One additional sediment sample was collected near the Site and analyzed for 4,4'-DDT.
- Nine background sediment samples were collected from the Intracoastal Waterway east of the Site and across the main waterway canal.
- Forty-eight sediment samples were collected in the North Area wetlands. Additional sediment samples were collected from the North Area wetlands and analyzed for 4,4'-DDT; five of these samples were also analyzed for zinc.
- Eight sediment samples were collected from the two ponds located in the North Area.
- Four surface water samples were collected in the Intracoastal Waterway adjacent to the Site.
- Four surface water samples were collected from the background surface water area.
- Four surface water samples were collected in the North Area wetlands.
- Six surface water samples were collected from the two ponds located in the North Area.

All data were compared to appropriate ecological screening levels to identify the chemicals of potential ecological concern that were quantitatively evaluated further in the SLERA. Several representative groups of wildlife were identified as receptors of potential concern for use in the SLERA. Each group of receptors represents a group of species (i.e., feeding guild) with similar habitat use and feeding habits that could potentially inhabit either the terrestrial, estuarine wetland, or aquatic habitats at the Site.

Potential ecological risks were calculated for the various mobile receptors using a standard hazard quotient (HQ) approach for the various media using no-observed-adverse-effects-level-based toxicity reference values, high-end conservative exposure assumptions, and 95 percent upper confidence limits on the mean exposure point concentrations. The exception to the HQ evaluation approach was fish, which were evaluated by comparing predicted tissue concentrations to literature studies that linked tissue concentrations to adverse effects. A sample-by-sample comparison of sediment samples to sediment screening criteria was also performed to ensure that the sedentary benthic organisms were adequately protected and HQs were calculated using maximum measured concentrations for the sedentary benthic organisms. Maximum surface water concentrations were compared to screening criteria or water quality standards to ensure that aquatic life communities were adequately protected.

Several of the risk calculations using maximum measured concentrations resulted in a HQ greater than one in soil from the South Area, North Area, and background area for the soil invertebrate (earthworm) receptor. HQs for the higher trophic level terrestrial receptors were less than one.

HQs exceeded one for two pesticides and several polynuclear aromatic hydrocarbons (PAHs) for the benthic receptor in Intracoastal Waterway sediment using maximum measured concentrations. No compounds were measured in Site Intracoastal Waterway surface water samples in excess of their surface water screening criteria. Predicted fish tissue concentrations were much less than adverse effects levels reported in the literature. HQs for the avian carnivores (sandpiper and green heron) were less than one. Localized adverse effects to sedentary biota communities may be possible at the sampling locations that exceeded the midpoint of the ERL/ERM. These chemicals of potential ecological concern (COPECs) will be further evaluated in a baseline ecological risk assessment (BERA).

In the background Intracoastal Waterway area, the only compounds that exceeded their screening level in sediment when using maximum measured concentrations were arsenic and nickel. Two COPECs (silver and 4,4'-DDT) were measured in excess of their surface water screening criteria. Predicted fish tissue concentrations were less than adverse effects levels reported in the literature. Adverse impacts were not predicted from COPECs in the background area of the Intracoastal Waterway. COPEC concentrations may, however, be used in the BERA to evaluate potential risks from the same COPECs in various Site areas.

For the North Area wetlands sediment, the HQs exceeded one for several pesticides, a number of PAHs, and several metals for the benthic receptor using maximum measured concentrations. Most of the HQs are less than ten. HQs for the avian carnivores (sandpiper and green heron) did not exceed one. Localized adverse effects may be possible at the sampling locations that exceed the midpoint of the ERL and ERM. Two COPECs (acrolein and dissolved copper) were measured in excess of their surface water screening criteria. Predicted fish tissue concentrations were less than adverse effects levels reported in the literature. There may be the potential for adverse impacts to sedentary biota communities in sediment and aquatic life communities (except fish) in surface water from the COPECs that exceed their HQs or water quality screening benchmarks, respectively. These COPECs will be further evaluated in a BERA.

HQs for 4,4'-DDT and zinc in pond sediment were greater than one when using the maximum measured concentrations. One of the avian carnivores (sandpiper) had an HQ that slightly exceeded one (1.2) from lead via the exposure pathways of sediment, surface water, and food ingestion. Dissolved silver was measured in pond surface water samples in excess of its surface water screening criteria. Predicted fish tissue concentrations were less than adverse effects levels reported in the literature. There may be the potential for adverse impacts to sedentary biota communities in sediment and aquatic life communities (except fish) in surface water from the COPECs that exceed their HQs or water quality screening benchmarks, respectively. Additionally, there may be the potential for adverse impacts to estuarine avian carnivores from lead in sediment, surface water, and food items via food chain exposures. These COPECs will be further evaluated in a BERA.

This information indicates a potential for adverse ecological effects to certain COPECs and receptors, and a more thorough assessment is warranted (i.e., continue to Step 3 of EPA's Ecological Risk Assessment Guidance for Superfund process). This conclusion is based on exceedances of protective ecological benchmarks for direct contact toxicity as well as literature-based food chain hazard quotients that exceed unity as described in the SLERA.

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) named the former site of Gulfco Marine Maintenance, Inc. (the Site) in Freeport, Brazoria County, Texas to the National Priorities List (NPL) in May 2003. The EPA issued a modified Unilateral Administrative Order (UAO), effective July 29, 2005, which was subsequently amended effective January 31, 2008. The UAO required the Respondents to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the Site. The Statement of Work (SOW) for the RI/FS at the Site, provided as an Attachment to the UAO from the EPA, requires an Ecological Risk Assessment (ERA). The SOW specifies that the Respondents follow EPA's *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1997). This guidance document proposes an eight-step approach for conducting a scientifically-defensible ERA:

1. Screening-Level Problem Formulation and Ecological Effects Evaluation;
2. Screening-Level Preliminary Exposure Estimate and Risk Calculation;
3. Baseline Risk Assessment Problem Formulation;
4. Study Design and Data Quality Objectives;
5. Field Verification of Sampling Design;
6. Site Investigation and Analysis of Exposure and Effects;
7. Risk Characterization; and
8. Risk Management.

Briefly, Steps 1 and 2 of the process are scoping phases of the ERA in which existing information is reviewed to preliminarily identify the ecological components that are potentially at risk, the chemicals of potential ecological concern (COPECs), and the transport and exposure pathways that are important to the ERA. This process is conducted using conservative assumptions to avoid underestimating risk or omitting receptors or COPECs, and constitutes the Screening-Level Ecological Risk Assessment (SLERA). Step 3 is the Baseline Problem Formulation that uses the results of the SLERA to identify methods for risk analysis and characterization, resulting in the identification of ERA data needs for the RI/FS. Steps 4 through 7 include formalization of the data needs, data collection, and data analysis for the risk characterization. Risk management activities are the eighth step in the process.

Steps 1 and 2 were performed through the submittal of an initial SLERA based on pre-RI data to EPA on November 17, 2005, as outlined in the SOW. The initial SLERA recommended collecting additional data to better characterize the nature and extent of contamination and potential risks associated with the Site. These data needs were identified in the RI/FS Work Plan (PBW, 2006a), which was approved with modifications by EPA on May 4, 2006 and finalized on May 16, 2006. Data needs were based on the preliminary conceptual site models (CSMs) provided in the Work Plan. Identification of COPECs for the baseline ecological risk assessment (BERA), which was one of the primary objectives of the initial SLERA, is based on maximum soil and sediment concentrations exceeding risk-based criteria. However, given the limited data available for the Site when the initial SLERA was conducted, eliminating COPECs from further evaluation or determining those that do required further evaluation could not be performed at that time.

As discussed at the August 4, 2005 Project Scoping Meeting and provided for in the RI/FS Work Plan, the SLERA and the resulting Scientific Management Decision Point (SMDP) were to be re-evaluated after the complete database of soil, sediment, and surface water samples collected during the RI was available. A Draft Nature and Extent Data Report (NEDR) providing these data was submitted to EPA on March 2, 2009 and was approved with modifications by EPA on April 29, 2009. The Final NEDR (PBW, 2009a), which incorporated the requested modifications, was submitted to EPA on May 20, 2009. This SLERA presents a re-evaluation of the November 16, 2005 SLERA (PBW, 2005), is based on the data presented in the NEDR (PBW, 2009a), and is responsive to EPA comments received on December 4, 2009 (EPA, 2009a) on the draft updated SLERA (PBW, 2009b).

1.1 PURPOSE AND SCOPE

The purpose and scope of this document is to summarize the analytical data for environmental media sampled during the RI and to conduct an updated SLERA based on those data. The SLERA is a conservative assessment and serves to evaluate the need and, if required, the level of effort necessary to conduct a baseline ecological risk assessment. Per EPA guidance (EPA, 2001), the SLERA provides a general indication of the potential for ecological risk (or lack thereof) and may be conducted for several purposes including: 1) to estimate the likelihood that a particular ecological risk exists; 2) to identify the need for site-specific data collection efforts; or 3) to focus site-specific ecological risk assessments where warranted.

This report provides documentation for whether further assessment (i.e., proceeding with the baseline ecological risk assessment) is necessary, and helps guide the next phases of evaluation, if necessary.

1.2 SITE SETTING AND HISTORY

The Site is located in Freeport, Texas in Brazoria County at 906 Marlin Avenue (also referred to as County Road 756). The Site consists of approximately 40 acres within the 100-year coastal floodplain along the north bank of the Intracoastal Waterway between Oyster Creek to the east and the Old Brazos River Channel to the west. Figure 1 provides a map of the site vicinity, while Plate 1 provides a detailed site map and shows site features and sampling locations.

During the 1960s, the Site was used for occasional welding but there were no on-site structures (Losack, 2005). According to the Hazard Ranking Score Documentation (TNRCC, 2002), from 1971 through 1999, at least three different owners used the Site as a barge cleaning facility. Beginning in approximately 1971, barges were brought to the facility and cleaned of waste oils, caustics and organic chemicals, with these products stored in on-site tanks and later sold (TNRCC, 2002). Sandblasting and other barge repair/refurbishing activities also occurred on the Site. At times during the operation, wash waters were stored either on a floating barge, in on-site storage tanks, and/or in surface impoundments on Lot 56 of the Site. The surface impoundments were closed under the Texas Water Commission's (Texas Commission on Environmental Quality (TCEQ) predecessor agency) direction in 1982 (Carden, 1982).

Marlin Avenue divides the Site into two areas. For the purposes of this report, it is assumed that Marlin Avenue runs due west to east. The property to the north of Marlin Avenue (the North Area) consists of undeveloped land and the closed surface impoundments, while the property south of Marlin Avenue (the South Area) was developed for industrial uses with multiple structures, a dry dock, sand blasting areas, an aboveground storage tank (AST) tank farm that is situated on a concrete pad with a berm, and two barge slips connected to the Intracoastal Waterway.

The South Area is zoned as "W-3, Waterfront Heavy" by the City of Freeport. This designation provides for commercial and industrial land use, primarily port, harbor, or marine-related activities. The North Area is zoned as "M-2, Heavy Manufacturing."

Adjacent property to the north, west and east of North Area is unused and undeveloped. Adjacent property to the east of the South Area is currently used for industrial purposes while the property directly to the west of the property is currently vacant and previously served as a commercial marina. The Intracoastal Waterway bounds the Site to the south. Residential areas are located south of Marlin Avenue, approximately 300 feet west of the Site, and 1,000 feet east of the Site.

2.0 SCREENING-LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION (STEP 1)

Problem formulation establishes the goals, scope and focus of the SLERA by describing the physical features of the site, the communities of potential receptors present at the site, the selection of assessment and measurement endpoints, and potential exposure pathways. This information serves as the basis for the conceptual site model, which is used to focus the remaining steps of the SLERA.

2.1 ENVIRONMENTAL SETTING

The Site is located between Galveston and Matagorda Bays and is situated along approximately 1200 feet (ft.) of shoreline on the Intracoastal Waterway. The Intracoastal Waterway is a coastal shipping canal that extends from Port Isabel to West Orange on the Texas Gulf Coast and is a vital corridor for the shipment of bulk materials and chemicals. It is the third busiest shipping canal in the United States, and along the Texas coast carries an average of 60 to 90 million tons of cargo each year (TxDOT, 2001). Of the cargo carried between Galveston and Corpus Christi, TX, 49 percent is comprised of petroleum and petroleum products and 38 percent is comprised of chemicals and related products. Approximately 50,000 trips were made by vessels making the passage through the Intracoastal Waterway between Galveston and Corpus Christi, TX in 2006 (USACE, 2006).

The South Area includes approximately 20 acres of upland that were created from dredged material from the Intracoastal Waterway. Prior to construction of the Intracoastal Waterway, this area was most likely coastal wetlands. The North Area, excluding the capped impoundments and access roads, is considered estuarine wetland (USFWS, 2008). The North Area consists of approximately five acres of upland, which supports a variety of herbaceous vegetation that is tolerant of drier soil conditions, while the North wetlands is approximately 15 acres in size.

2.1.1 <u>Terrestrial Areas</u>

According to the United States Department of Agriculture (USDA) County Soils Maps (USDA, 1981), surface soils south of Marlin Avenue are classified as Surfside clays, and soils north of the road are classified as Velasco clays. Both soils are listed on the state and federal soils lists as hydric soils. The Velasco series consists of very deep, nearly level, very poorly drained saline soils. These soils formed in thick recent clayey sediments near the mouth of major rivers and streams draining into the Gulf of Mexico. They occur on level to slightly depressed areas near sea level and are saturated most of the year. Slope is less than one percent. The Surfside series consists of very deep, very poorly drained, saline soils that formed in recent clayey coastal sediments. They are saturated most of the year, and are on level to depressed areas near sea level with a slope less than one percent. It should be noted, however, that during drought periods, much of the wetlands area north of the Site is dry and desiccated, with standing water confined to very limited, localized areas.

Much of the South Area is covered with concrete slabs associated with former structures or Site operations. Because of the former industrial operations, the South Area contains very few areas of undisturbed terrestrial or upland habitat. Little resident wildlife has been observed at the South Area. During field work, nests were noted on some of the vertical structures at the Site.

The approximately five acres of terrestrial or upland habitat at the North area was created during previous operations at the Site. The five acres has developed some vegetation because plants have grown in some areas of the oyster-shell covered parking lot and former surface impoundments cap.

2.1.2 North Area Wetlands

There are two ponds on the North Area, located east of the former surface impoundments (Plate 1). The larger of the two ponds is called the Fresh Water Pond while the other pond is referred to as the Small Pond. It should be noted, however, that based on field measurements of specific conductance and salinity, the water in the Fresh Water Pond is brackish while water in the Small Pond is less brackish (but is not fresh water). The Fresh Water Pond water depth is generally 4 to 4.5 feet. The Small Pond is a shallow depression that tends to dry out during summer months and periods of drought; the water depth was approximately 0.2 feet when sampled in July 2006 and nearly dry when sampled in June 2008.

Based on field observations, the wetland in the North Area appears tidally influenced. Figure 2 depicts wetlands areas in the Site vicinity. Wetlands are the transitional zones between uplands and aquatic habitats and usually include elements of both. The wetlands at the Site are typical of irregularly flooded tidal marshes on the Texas Gulf Coast. The lower areas in the northern half of the property are dominated by obligate and facultative wetland vegetation such as saltwort (*Batis maritima*), sea-oxeye daisy (*Borrichia frutescens*), shoregrass (*Monanthocloe littoralis*), Carolina wolf berry (*Lycium caroliniaum*), spike sedge (*Eleocharis sp*.), and glasswort (*Salicornia bigelovii*). Higher ground near the road supports facultative wetland vegetation such as eastern bacchari (*Baccharis halimifolia*), sumpweed (*Iva frutescens*), and wiregrass (*Spartina patens*). Near Marlin Avenue, there are several shallow depressions that apparently collect and hold enough freshwater to allow homogenous stands of saltmarsh bulrush (*Schoenoplectus robustus*) to develop.

The high marsh, or supra-tidal zone, is the driest part of the coastal marsh habitat and supports far fewer invertebrate species. Due to the irregularity of flooding in the high marsh, there are no filter feeding bivalves or worms. Rather, the worms, amphipods, and isopods that live in the high marsh sediment are detritivores, direct deposit feeders, or predators. The crabs that live in the high marsh live in burrows that are excavated to groundwater, allowing them to keep their gills moist. Most crab species only return to the water to lay their eggs.

The North Area supports wildlife that would be common in a Texas coastal marsh. Fiddler crabs (*Uca rapax*) are likely the most abundant crustacean in the North Area. Other crustaceans found at the Site were fiddler crabs (*Uca panacea*), and hermit crabs (*Clibanarius vittatus*). The most common gastropod is the marsh periwinkle (*Littorina irrorata*). The Site is also used by a variety of shorebirds. Birds observed at the Site include the great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), green heron (*Butorides striatus*), white ibis (*Eudocimus albus*), glossy ibis (*Plegadis falcinellus*), and willet (*Catoptrophorus semipalmatus*). The Site provides suitable habitat for rails, sora, and gallinules and moorhens, and may also be used by a variety of small mammals, rodents, and reptiles.

Other than gross disturbances in the wetlands area due to the former surface impoundment caps and other man-made upland terrain, the North Area wetlands is functionally and visually identical to the adjacent off-site wetlands area. Likewise, observations made during sediment sampling indicated consistent sediment characteristics for all North Area wetlands sampling locations.

2.1.3 Intracoastal Waterway

The Intracoastal Waterway supports barge traffic and other boating activities. The area near the Site is regularly dredged and, as noted by the United States Fish and Wildlife Service (USFWS), shoreline habitat is limited (USFWS, 2005a). Reduced light penetration, periodic dredging, wave action from barge traffic, and higher than normal tidal energy prevent submerged vegetation from growing in the Intracoastal Waterway near the Site. The absence of attached vegetation, which provides food and shelter, decreases the number of invertebrate species that can utilize the habitat in this sub-tidal zone and, therefore, most of the epibenthic invertebrates that utilize the sub-tidal zone in the Intracoastal Waterway near the Site are migrants.

Because of the reduced tidal energy at the upper end of each of the barge slips, there is a small amount of intertidal emergent marsh that has developed in these areas. Sand and silt has accumulated in the ends of the slips and is supporting small stands of gulf cordgrass (*Spartina alterniflora*). Sheetpile and concrete bulkheads protect the remainder of the shoreline. The bulkheads provide habitat for oysters (*Crassostrea virginica*), barnacles (*Balanus improvisus*), sea anemones (*Bunodosoma cavernata*), limpets and sponges.

Fishing has been known to occur on and near the Site. Red drum (*Sciaenops ocellatus*), black drum (*Pogonias cromis*), spotted seatrout (*Cynoscion nebulosus*), southern flounder (*Paralichthys lethostigma*) and other species are reportedly caught in the area (TPWD, 2009). It should be noted that, during the fish sampling conducted for the human health fish ingestion pathway risk assessment, red drum were not caught (using nets) as frequently as other species (see discussion in NEDR (PBW, 2009a)), presumably because of a lack of habitat and prey items to keep them near the Site. Recreational and commercial fishermen collect blue crabs (*Callinectes sapidus*) from waterways in the area. The Texas Department of State Health Services (TDSHS) has banned the collection of oysters from this area due to biological hazards and has issued a consumption advisory for king mackerel for the entire Gulf Coast due to mercury levels in the fish (TDSHS, 2005).

2.2 NATURE AND EXTENT OF POTENTIAL CONTAMINATION

Data related to the nature and extent of potential contamination in ecologically-relevant media (e.g., soil, sediment, and surface water) at the Site were obtained as part of the RI and, as noted previously, are discussed in the NEDR (PBW, 2009a). Unless otherwise noted, the samples were analyzed for the full suite of analytes as specified in the approved Work Plan (PBW, 2006a). Plate 1 provides sample locations for site-related samples, and Figure 3 provides sample locations for the background soil, surface water, and sediment samples. It should be noted on Plate 1, that different grid lines/areas and Zones 1 through 4 are identified. The grids were used to help locate samples based on EPA's preference to collect soil samples randomly over a grid while the zones represent the different areas where fish were sampled.

Tables 1 through 17 summarize the key parameters for the chemicals of interest (COIs) measured in these samples. A chemical of interest is defined in this report as any compound measured in at least one sample above the detection limit and at a detection frequency of greater than five percent. Tables 1 through 17 provide maximum and minimum measured concentrations, as well as summary statistics for each COI for each media. The 95% upper confidence limits (95% UCLs) on the mean were estimated using EPA guidance (EPA, 2002a) and are described in greater detail in the following section.

Eighty-three surface soil samples (0 to 0.5 ft below ground surface (bgs)) and 83 subsurface soil samples (0.5 ft to 4 ft bgs) were collected in the South Area. Eighteen surface soil samples and 18 subsurface soil samples were collected in the North Area. Two additional surface soil samples were collected near the former transformer shed at the South Area for polychlorinated biphenyls (PCBs) analyses only. Ten background soil samples were collected within the approved background area approximately 2,000 feet east of the Site near the east end of Marlin Avenue (Figure 3).

Sixteen sediment samples were collected from the Intracoastal Waterway in front of the Site. Nine background sediment samples were collected from the Intracoastal Waterway east of the Site and across the canal. One additional sediment sample was collected from the Intracoastal Waterway near the Site and analyzed for DDT to further characterize the extent of contamination as described in the NEDR (PBW, 2009a). Forty-eight sediment samples were collected in the North Area wetlands. Additional sediment samples were collected from the North Area wetlands and analyzed for DDT; five of these samples were also analyzed for zinc. A total of eight sediment samples were collected from the two ponds located in the North Area.

Four surface water samples were collected in the Intracoastal Waterway adjacent to the Site. Four surface water samples were collected from the background surface water area – the Intracoastal Waterway east of the Site, and across the canal (Figure 3). Four surface water samples were collected in the wetlands drainage areas north of Marlin Avenue and a total of six surface water samples were collected from the two ponds located in the North Area. Chemical analyses of these surface water samples included both total and dissolved concentrations of metals.

2.3 POTENTIALLY COMPLETE EXPOSURE PATHWAYS AND PRELIMINARY CONCEPTUAL SITE MODEL

The identification of potentially complete exposure pathways is performed to evaluate the exposure potential as well as the risk of effects on ecosystem components. In order for an exposure pathway to be considered complete, it must meet all of the following four criteria (EPA, 1997):

- A source of the contaminant must be present or must have been present in the past.
- A mechanism for transport of the contaminant from the source must be present.
- A potential point of contact between the receptor and the contaminant must be available.
- A route of exposure from the contact point to the receptor must be present.

Exposure pathways can only be considered complete if all of these criteria are met. If one or more of the criteria are not met, there is no mechanism for exposure of the receptor to the contaminant. Potentially complete pathways used in the SLERA are shown in the conceptual site models for the terrestrial and estuarine ecosystems (Figures 4 and 5, respectively).

In general, biota can be exposed to chemical stressors through direct exposure to abiotic media, or through ingestion of forage or prey that have accumulated contaminants. Exposure routes are the mechanisms by which a chemical may enter a receptor’s body. Possible exposure routes include 1) absorption across external body surfaces such as cell membranes, skin, integument, or cuticle from the air, soil, water, or sediment; and 2) ingestion of food and incidental ingestion of soil, sediment, or water along with food. Absorption is especially important for plants and aquatic animals.

2.4 THREATENED AND ENDANGERED SPECIES

The USFWS was consulted (USFWS, 2005b) and information was obtained from the USFWS and Texas Parks and Wildlife Department (TPWD) regarding Threatened and Endangered Species. According to USFWS (USFWS, 2005c), Threatened and Endangered Species for Brazoria County include: bald eagle (*Haliaeetus leucocephalus*), brown pelican (*Pelecanus occidentalis*), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricate*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), piping plover (*Circus melodus*), and whooping crane (*Grus americana*). According to TPWD (TPWD, 2005), Threatened and Endangered Species for Brazoria County include: bald eagle (*Haliaeetus leucocephalus*), black rail (*Laterallus jamaicensis*), eastern brown pelican (*Pelecanus occidentalis*), interior least tern (*Sterna antillarum*), piping plover (*Circus melodus*), reddish egret (*Falco rufescens*), swallow-tailed kite (*Elanoides forficatus*), white-faced ibis (*Plegadis chihi*), wood stork (*Mycteria americana*), and corkwood (*Leitneria floridana*). None of these species have been observed at the Site but they are known to live in or on, feed in or on, or migrate through the Texas Gulf Coast and estuarine wetlands (TPWD, 2005).

2.5 ASSESSMENT AND MEASUREMENT ENDPOINTS

Assessment endpoints are explicit expressions of the ecological resource to be protected for a given receptor of potential concern (EPA, 1997). Identification of assessment endpoints is necessary to focus the SLERA on relevant receptors rather than attempting to evaluate risks to all potentially affected ecological receptors. Measurement endpoints comprise what are actually measured to protect the assessment endpoints. Assessment and measurement endpoints are discussed in relation to the risk question and testable hypotheses for each habitat and receptor group in Tables 18 and 19 (terrestrial and estuarine wetland/aquatic, respectively).

2.5.1 Terrestrial Assessment Endpoints

The terrestrial habitat associated with the Site includes the entire South Area and a small area of land adjacent to Marlin Avenue near the former surface impoundments in the North Area. The environmental value of this area is related to its ability to support plant communities, soil microbes/detritivores and wildlife. As indicated on Figure 4 and described in Table 18, the assessment endpoints for this area include:

- Vegetation survival, growth, and reproduction are values to be preserved in the terrestrial ecosystem. As food, plants provide an important pathway for energy and nutrient transfer from the soil to herbivores, omnivores, and invertebrates. Plants also provide critical habitat for terrestrial animals.
- Detritivore survival, growth, and reproduction and function (as a decomposer) are ecological values to be preserved in a terrestrial ecosystem because they provide a mechanism for the physical and chemical breakdown of detritus for microbial decomposition (remineralization), which is a vital function.
- Mammalian and avian herbivore and omnivore survival, growth, and reproduction are ecological values to be preserved in a terrestrial ecosystem because they are critical components of local food webs in most habitat types. In addition, small mammal and avian receptors can be important in the dispersal of seeds and the control of insect populations.
- Mammalian, reptilian, and avian carnivore survival, growth, and reproduction are values to be preserved in the terrestrial ecosystem because they provide food to other carnivores, omnivores, scavengers, and microbial decomposers. They also affect the abundance, reproduction, and recruitment of lower trophic levels, such as vertebrate herbivores and omnivores, through predation.

2.5.2 Estuarine Wetland and Aquatic Habitat Assessment Endpoints

The estuarine wetland habitat for the Site extends over the majority of the North Area while the Intracoastal Waterway (i.e., aquatic habitat) is south of the Site. Wetlands are particularly important habitat because they often serve as a filter for water prior to it going into another water body, they are important nurseries for fish, crab, and shrimp, and they act as natural detention areas to prevent flooding. The environmental value for these areas is related to their ability to support wetland plant communities, microbes/benthos/detritivores and wildlife. As indicated in Figure 5 and described in Table 19, the assessment endpoints for the estuarine wetland and Intracoastal Waterway aquatic habitat include:

- Wetland vegetation survival, growth, and reproduction are values to be preserved in the estuarine wetland ecosystem. As food, plants provide an important pathway for energy and nutrient transfer from the soil to herbivores and omnivores as well as invertebrates. Plants also provide critical habitat for vertebrates and invertebrates.
- Benthos survival, growth, and reproduction are values to be preserved because these organisms provide a critical pathway for energy transfer from detritus and attached algae to other omnivorous organisms (e.g., polychaetes (*Capitella capitata*) and crabs) and carnivorous organisms (e.g., black drum and sandpipers), as well as integrating and transferring the energy and nutrients from lower trophic levels to higher trophic levels. The most important service provided by benthic detritivores is the physical breakdown of organic detritus to facilitate microbial decomposition.
- Zooplankton survival, growth, and reproduction are values to be preserved. Zooplankton provide a food source for energy transfer through the water column-based pathway from phytoplankton to filter feeding and planktivorous organisms (e.g., finfish, shrimp, clams, worms, and oysters).
- Herbivorous and omnivorous fish and shellfish survival, growth, and reproduction are values to be preserved because they are critical components of the food web.
- Vertebrate carnivore (i.e., fish, fish-eating, and invertebrate-eating birds) survival, growth, and reproduction are values to be preserved. Vertebrates provide food for other carnivores and omnivores and affect species composition, recruitment, and abundance of lower trophic level organisms.

Because the Intracoastal Waterway is a deep, high-energy environment (i.e., dredged regularly) and light penetration is poor due to the high turbidity, submerged aquatic vegetation is not likely to thrive and, as such, is not an ecological resource to be protected as part of this assessment. Therefore, an assessment endpoint was not developed for submerged aquatic vegetation.

2.5.3 Measurement Endpoints

The measurement endpoints for the Site and the Intracoastal Waterway are the measurements of spatial distribution of chemical concentrations in soil, surface water and sediment to assess exposure concentrations for potentially exposed receptors. Maximum concentrations of chemicals measured in environmental media were compared to ecological benchmarks for the purposes of the screening-level problem formulation and ecological effects characterization (Step

1) of the SLERA. Food web dose calculations and comparisons with toxicity reference values as described in Section 3 provides a second measurement endpoint for higher trophic level receptors.

2.6 SELECTION OF AND COMPARISON TO ECOLOGICAL BENCHMARKS

This section describes the ecological benchmarks used to initially evaluate the data, and provides a summary of the comparison between Site data and the benchmarks. The benchmarks were chosen to conservatively represent the assessment endpoints since they are generally protective of the most relevant or sensitive endpoint for a variety of species. This was performed as an initial step in the SLERA process given the large number of analytes, media and receptors analyzed during the RI/FS and evaluated in the SLERA. It is believed that this is a reasonable step since the Site has been thoroughly characterized and the evaluation includes a robust data set. The COIs with no ecological benchmarks are discussed in the uncertainty section (Section 4.0).

It should be noted that any chemical considered to be bioaccumulative by the TCEQ (as defined in Table 3-1 of their ecological guidance document (TCEQ, 2006)) was retained for further evaluation if it was detected in at least one sample, even if it was reported below a screening criteria or if there was not a screening criteria. This approach was conservatively taken to ensure that food chain effects were considered for bioaccumulative compounds.

In addition, polynuclear aromatic hydrocarbons (PAHs) were evaluated as individual compounds, as a total concentration, and grouped as high-molecular weight (HPAH) or low-molecular weight (LPAH) as defined by TCEQ in Box 3-6 of the TNRCC (2001) ecological risk guidance. To quantitatively evaluate classes of PAHs in Step 2, individual PAHs were not eliminated from further assessment in Step 1 if it was detected in one sample of a given media, even if they were measured below their benchmark. It should be noted, however, if an individual PAH was not measured above the detection limit in any samples for that media, it was not included in the total PAH, HPAH, or LPAH estimate.

2.6.1 Soil

Soil sample data were compared with EPA and TCEQ ecological soil screening values contained in Tables 1 through 5. The EPA soil screening values were obtained from EPA's website at www.epa.gov/ecotox/ecossl/ while the TCEQ values were obtained from Table 3-4 of TCEQ ecological guidance document (TCEQ, 2006). The screening value listed in Tables 1 through 5 is the lowest of the values provided by each Agency for plants, soil invertebrates, avians, and mammals (as indicated with the notation of “p”, “i”, “a”, or “m”, respectively).

South Area. Tables 1 and 2 provide a summary of the data for South Area soil samples. Only compounds with measured detections, including “J” flagged (or estimated) data, are listed in these tables. Table 1 contains only surface soil (0 to 0.5 ft bgs) data while Table 2 provides data for both surface and subsurface samples (0.5 ft to 4 ft bgs). This distinction was made to account for the different soil horizons that the different receptors may be exposed. For example, it was assumed that incidental ingestion of soil for the avian herbivore/omnivore (American robin) would only occur within the 0 to 0.5 ft bgs soil whereas an invertebrate (earthworm) may reasonably be exposed to the surface soil and the soil below 0.5 ft bgs as well.

At least one South Area soil sample contained 4,4’-DDT, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, dieldrin, lead, lithium, manganese, mercury, molybdenum, nickel, vanadium, zinc, LPAHs or HPAHs at a concentration above an ecological benchmark. Figures 6A, 6B, 6C and 6D show sample locations and associated concentrations of compounds measured above their screening value. Inspection of these four figures does not indicate any obvious hot spots or concentration gradients. Screening value exceedences, primarily for metals such as antimony, boron, cadmium, chromium, lead, lithium, manganese, vanadium and zinc, were noted at nearly all sample locations. Concentrations above the maximum soil background value for a specific compound were highlighted blue on these figures. A relatively small percentage (less than half) of the screening value exceedences were also above background.

Although not reported in any South Area soil sample at a concentration above an ecological benchmark, 4,4’-DDD, 4,4’-DDE, Aroclor-1254, gamma-Chlordane, endrin aldehyde, and endrin ketone were detected in at least one South Area soil sample and are considered bioaccumulative in soil. These compounds, as well as those compounds with at least one sample concentration exceeding a benchmark, were evaluated further in the SLERA.

North Area. Tables 3 and 4 provide a summary of the data for North Area soil samples. Only compounds with measured detections, including “J” flagged (or estimated) data, are listed in these tables. Table 3 contains only surface soil data. Table 4 provides data for both surface (0 to 0.5 ft bgs) and subsurface samples (0.5 ft to 4 ft bgs). This distinction was made to account for the different soil horizons that the different receptors may be exposed. At least one sample contained antimony, barium, boron, cadmium, chromium, copper, dieldrin, lead, lithium, manganese, molybdenum, nickel, vanadium, zinc, or HPAHs at a concentration above its ecological benchmark. Figures 7A, 7B, and 7C shows sample locations and associated concentrations of compounds measured above their screening value. Hot spots or concentration gradients were generally not indicated on these figures. Screening value exceedences, primarily for metals such as antimony, boron, chromium, lead, lithium, vanadium and zinc, were noted at nearly all sample locations. However, a localized area of HPAH exceedences was indicated immediately south of the former surface impoundments. The maximum concentrations of many metals (indicated in bold on the figures) was observed at location SB-202 (southeast of the former surface impoundment) where scrap metal was observed at the ground surface. As indicated by the blue highlighting on these figures, less than half of these screening value exceedences were also above background.

Although not reported in any North Area soil sample at a concentration above an ecological benchmark, endrin, endrin ketone, mercury, Aroclor-1254, 4,4'-DDE, and 4,4'-DDT were detected in at least one North Area soil sample and are considered bioaccumulative in soil. These compounds, as well as those compounds with measurements exceeding a benchmark, were evaluated further in the SLERA.

Background Soils. Table 5 provides a summary of the data for background soil samples (all surface samples). Only compounds with measured detections, including "J" flagged (or estimated) data, are listed in the table. At least one background sample contained antimony, barium, chromium, lead, lithium, manganese, zinc, or HPAHs at a concentration above its ecological benchmark. Figure 8 shows sample locations and associated concentrations of compounds measured above their screening value in these background soil samples, thus the compounds shown on Figure 8 are a subset of all compounds detected in background soil samples (listed in Table 5). Although not reported in any background soil sample at a concentration above the ecological benchmark, cadmium, copper, and mercury were detected in at least one background soil sample and are considered bioaccumulative in soil. These compounds, as well as those compounds with measurements exceeding a benchmark, were evaluated further in the SLERA. It should be noted that boron, nickel, strontium, titanium, and vanadium analyses were not performed on background soil samples.

2.6.2 Sediment

Sediment sample data were compared with EPA and TCEQ ecological screening values contained in Tables 6 through 9. The sediment screening values were the lower of the benchmark criterion obtained from EPA's ECO Update re: Ecotox Thresholds (EPA, 1996) and the TCEQ's ecological benchmarks listed in Table 3-3 of TCEQ (2006). The hierarchy for the benchmark values from the Ecotox Thresholds was marine sediment quality criteria, sediment quality benchmark, and Effects Range Low (ERL) value. The midpoint between the ERL and Effects Range Low (ERM) are presented in the table as well. This is, in most if not all cases, the same as the TCEQ's Protective Concentration Limit (PCL) under the Texas Risk Reduction Program (TRRP).

Intracoastal Waterway. Table 6 provides a summary of the data for sediment samples collected in the Intracoastal Waterway adjacent to the Site. Only compounds with measured detections, including "J" flagged (or estimated) data are listed in the table. At least one sample contained 4,4'-DDT, acenapthene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, pyrene, fluoranthene, fluorene, phenanthrene, pyrene, LPAHs, HPAHS, or total PAHs at a concentration above an ecological benchmark. Figure 9 shows sample locations and associated concentrations of compounds measured above their screening value. As shown on this figure, the most exceedences and the maximum concentrations of nearly all compounds were associated with sample IWSE03 at the northern end of the western barge slip. Although not reported in any Intracoastal Waterway sediment sample at a concentration above an ecological benchmark, copper, gamma-Chlordane, hexachlorobenzene, mercury, nickel, and zinc were detected in at least one sediment sample and are considered bioaccumulative in sediment. These compounds, as well as those compounds with measurements exceeding a benchmark, were evaluated further in the SLERA.

Intracoastal Waterway Background. Table 7 provides a summary of the data for sediment samples collected in the Intracoastal Waterway background area. Only compounds with measured detections, including "J" flagged (or estimated) data, are listed in the table. At least one sample contained arsenic or nickel at a concentration above its ecological benchmark, as shown in Figure 10. Although not reported in any Intracoastal Waterway background sample at a concentration above an ecological benchmark, copper, 4,4'-DDT, mercury, and zinc were detected in at least one sediment sample and are considered bioaccumulative in sediment. These compounds, as well as those compounds with measurements exceeding a benchmark, were evaluated further in the SLERA.

Wetlands. Table 8 provides a summary of the data for sediment samples collected in the wetlands area north of Marlin Avenue. Only compounds with measured detections, including “J” flagged (or estimated) data, are listed in the table. At least one sample contained 2-methylnaphthalene, 4,4’-DDT, acenaphthene, acenaphthylene, anthracene, arsenic, benzo(a)anthracene, benzo(a)pyrene, chrysene, copper, dibenz(a,h)anthracene, endosulfan sulfate, fluoranthene, fluorene, gamma-chlordane, lead, nickel, phenanthrene, pyrene, zinc, LPAHs, HPAHs, or total PAHs at a concentration above its ecological benchmark. Figure 11 shows sample locations and associated concentrations of compounds measured above their screening value. As shown on this figure, the predominant compounds detected in wetland sediment samples were PAHs. Most of the PAH concentrations in wetland sediment samples exceeding screening levels are located in three areas: (1) an area immediately northeast of the former surface impoundment (where most of the maximum PAH concentrations were observed); (2) an area immediately south of the former surface impoundments; and (3) at sample location NB4SE08 in the southeast part of the North Area. Although not reported in any wetlands sediment sample at a concentration above an ecological benchmark, cadmium, endrin aldehyde, endrin ketone, and mercury were detected in at least one sediment sample and are considered bioaccumulative in sediment. These compounds, as well as those compounds with measurements exceeding a benchmark, were evaluated further in the SLERA.

Ponds. Table 9 provides a summary of the data for sediment samples collected in the ponds north of Marlin Avenue. Only compounds with measured detections, including “J” flagged (or estimated) data, are listed in the table. At least one sample contained 4,4’-DDT or zinc at a concentration above its ecological benchmark as shown in Figure 12. As shown in this figure, the highest zinc concentration and the sole 4,4’-DDT exceedence were all in the southernmost sample in the Small Pond. Although not reported in any pond sediment sample at a concentration above an ecological benchmark, cadmium, copper, 4,4’-DDD, and nickel were detected in at least one sediment sample and are considered bioaccumulative in sediment. These compounds, as well as those compounds with measurements exceeding a benchmark, were evaluated further in the SLERA.

2.6.3 Surface Water

Surface water samples were compared with national water quality criterion, Texas Surface Water Quality Standards (TSWQS), and TCEQ ecological screening criteria, which were obtained from TCEQ's ecological benchmarks listed in Table 3-2 of TCEQ (2006). If the benchmark was listed for dissolved concentrations (only applicable to metals), it was not compared to the total concentration data.

Intracoastal Waterway. Tables 10 and 14 summarize the analytical data for total and dissolved concentrations, respectively, for surface water samples collected from the Intracoastal Waterway adjacent to the Site. Since there were no compounds that were measured in excess of a screening level, there is not a figure to identify exceedances. Selenium (dissolved), which is considered bioaccumulative in water and will be further evaluated in the SLERA, was measured in four of four surface water samples collected from the Intracoastal Waterway but at concentrations below the benchmark.

Intracoastal Waterway Background. Tables 11 and 15 summarize the analytical data for total and dissolved concentrations, respectively, for surface water samples collected in the Intracoastal Waterway background area, east of the Site and across the Intracoastal Waterway. Figure 13 shows sample locations and associated concentrations of compounds measured above their screening value. 4,4'-DDT and dissolved silver were detected in at least one sample in excess of their respective benchmark values. 4,4'-DDD and 4,4'-DDT were detected in two of four and one of four surface water samples, respectively, collected at the background locations and are considered bioaccumulative although it should be noted that 4,4'-DDD was not measured at a concentration greater than the benchmark. Aldrin, a bioaccumulative pesticide, was detected in all four samples but is not considered Site-related since it was not detected in any Site samples.

Wetlands. Tables 12 and 16 summarize the analytical data for total and dissolved concentrations, respectively, for surface water samples collected in the wetlands drainage areas north of Marlin Avenue. Acrolein and dissolved copper were detected in at least one sample in excess of their respective benchmark. Figure 14 shows sample locations and associated concentrations of compounds measured above their screening value. Mercury, which is considered bioaccumulative and will be further evaluated in the SLERA, was detected in two of four surface water samples (total concentrations only) but below a benchmark for a dissolved concentration.

Ponds. Tables 13 and 17 summarize the analytical data for total and dissolved concentrations, respectively, for surface water samples collected in the two ponds located in the North Area. Dissolved silver was detected in all six pond surface water samples in excess of its benchmark value. Figure 15 shows sample locations and associated concentrations of compounds measured above their screening value. Thallium, which is considered bioaccumulative by the TCEQ, was measured in all three dissolved surface water samples collected from the Small Pond. Selenium, which is also considered bioaccumulative in water, was measured in one total surface water sample collected from the Small Pond. No concentration of selenium or thallium was measured above their benchmarks, but they will be further evaluated in the SLERA because of their bioaccumulative properties.

2.7 COMPARISON TO THE BACKGROUND AREAS

Soil samples were collected at ten off-site locations; sediment samples were collected at nine off-site locations in the Intracoastal Waterway; and four surface water samples were collected at four off-site "zones" in the Intracoastal Waterway as described in the Work Plan (PBW, 2006a) to help provide an understanding of what COIs and concentrations may be considered site-related. This information was used to characterize Site conditions in the NEDR (PBW, 2009a).

EPA guidance for conducting SLERAs (EPA, 2001) recommends that comparison with background generally not be used to remove compounds from further evaluation in order to conservatively ensure that site risks are adequately characterized. This recommendation is based on the premise that the SLERA is often conducted on limited data set prior to a comprehensive site characterization. A background comparison, however, was conducted in this SLERA because: 1) a large Site data set was developed during the RI (including data for an approved and Site-specific background area); 2) the nature and extent of contamination at the Site has been thoroughly and completely characterized, and 3) the high quality of the Site and background data allows for a reliable comparison. This background comparison was conducted for reference purposes only and not to screen out compounds or characterize the significance of Site risks. It is recognized that even if a "background" contaminant can be identified, there may also be contribution to risk from the same contaminant attributable to Site-related risk.

The soil background data were compared to soil from the South Area and North Areas of the Site, as well as sediments from the North wetland and the North Area ponds. As described in the NEDR (PBW, 2009a), based on similarities in composition and condition between background soil and sediments of the North wetlands area, this comparison was appropriate. Sediment and surface water data for the Intracoastal Waterway samples were compared to sediment and surface water data collected in the Intracoastal Waterway background location.

Comparisons between Site sampling data and Site-specific background data were conducted for all inorganic compounds measured in excess of their respective benchmark values. Background comparisons were also made for compounds considered bioaccumulative but measured at a concentration less than the benchmark. The background comparisons were performed in accordance with EPA's *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (EPA, 2002b). Distribution testing was conducted to estimate 95% UCLs and the summary statistics were used to perform comparison of the means analyses. The output of these background statistical comparison tests is provided in Appendix B.

In several instances (e.g., lithium in South Area soil; barium in North Area wetlands sediment), statistical differences between the two data sets were due to higher concentrations in the background population, as noted in Table 1 of Appendix B. It should be noted that no compounds were eliminated from further consideration in the SLERA based on the comparison to background concentrations. The list of COPECs carried through Step 2 of the SLERA is presented in Table 21 and includes any compound measured above its screening level in at least one sample, or any compound measured above its detection limit that is considered bioaccumulative per TCEQ guidance (TCEQ, 2006).

A statistical comparison between Site surface water and background surface water could not be conducted given the small size of both data sets. Visual inspection of the data indicates that there is no consistent observable difference between the data sets and COIs except for dissolved silver, which was detected in all four background surface water samples at higher concentrations than any Site surface water samples.

3.0 SCREENING-LEVEL PRELIMINARY EXPOSURE ESTIMATE AND HAZARD QUOTIENT CALCULATION (STEP 2)

The screening-level exposure and risk calculation description presented in this section of the SLERA corresponds to Step 2 of EPA guidance (EPA, 1997). Step 2 includes a quantitative assessment of potential ecotoxicity and the result of Step 2 is a decision on whether additional ecological risk evaluation is necessary.

3.1 RECEPTORS OF POTENTIAL CONCERN

Several representative groups of wildlife were identified as receptors of potential concern (ROPCs) for use in the SLERA. Each receptor represents a terrestrial or aquatic community of species or group of species (i.e., feeding guild) with similar habitat use and feeding habits that could potentially inhabit either the terrestrial, estuarine wetland, or aquatic habitats at the Site. Representative species groups that may use the habitats at the Site are described briefly below. When several species may be present that could represent the feeding guild for a habitat, the species was chosen as the ROPC for that feeding guild based on its habitat affinity and potential for exposure. It should be noted, however, that each species chosen below as the representative receptor is symbolic of the entire guild so that all species within that guild are evaluated (and protected), not just the representative species/receptor. Table 20 provides a summary of the guilds evaluated in the SLERA and the ROPCs that were chosen to represent the guild.

3.1.1 Terrestrial Receptors

- Detritivores, Invertebrates and Terrestrial Plants. There are limited terrestrial areas at the Site. The earthworm was chosen to represent detritivores and invertebrates for the terrestrial ecosystem in this area because it is an important part of the food chain as prey for some first-order carnivores. Terrestrial plants were chosen as one of the terrestrial receptors because of their importance as an ecological community in providing cover, food, and nesting areas for a variety of species at the Site.

- Mammalian Herbivores and Omnivores. Habitat type plays a major role in the presence and abundance of the various species of mammals found at the Site. Of the three major groups of mammalian receptors (carnivores, ungulates, and rodents) potentially found at the Site, the small mammalian rodents are the most diverse and complex, and are most likely to have the highest area use factor. The habitat most likely does not support an ungulate population because it does not provide protective cover that they prefer although they may graze on some of the terrestrial plants on occasion. The deer mouse (*Peromyscus maniculatus*) and Least shrew (*Cryptotis parva*) were selected as the ROPCs for the various feeding guilds of small mammals at the Site. Dietary composition for the small mammalian herbivore (deer mouse), with an assumed area use factor of 100 percent, was assumed to be 10% terrestrial invertebrates and 90% terrestrial plant tissue while the dietary composition for the small mammalian omnivore (least shrew), with an assumed area use factor of 100 percent, was assumed to be 90% terrestrial invertebrates and 10% terrestrial plant tissue in order to assess the potential exposures to a receptor ingesting a general mix of prey types at the Site. The small mammalian herbivore (deer mouse) was assumed to have a 2% incidental soil ingestion rate and the small mammalian omnivore (least shrew) was assumed to have an 8% incidental soil ingestion rate (Beyer, et al., 1994).

- <u>Mammalian Carnivores</u>. Carnivores potentially present include omnivores such as the spotted and striped skunks, raccoon, and coyote (*Canis latrans*). A skunk was observed at the Site and fecal evidence of a carnivorous species was also observed at the Site. Since some of the COPECs are considered bioaccumulative compounds, assessing risks to an upper trophic level receptor is appropriate. Therefore, the coyote (*Canis latrans*) was selected as the ROPC for the mammalian carnivore feeding guild as it may feed at the Site on occasion as part of its larger home range. An area use factor of 100 percent was conservatively assumed per EPA (1997), and it was assumed that the large mammalian carnivore (coyote) ingests 2% of its dietary intake via incidental soil ingestion (Beyer, et al., 1994).

- <u>Reptilian Carnivores</u>. A representative reptilian predator for the Site is the rat snake (*Elaphe obsolete*), which has been observed at the Site. Rat snakes feed primarily on small mammals and eggs.

- <u>Avian Herbivores and Omnivores</u>. In general, avian species are influenced by the same types of landscape components as mammals, although vegetation is by far the more important factor. Birds are generally less important than mammals in terrestrial risk assessments because they live in less intimate contact with the soil, are highly mobile, and in many cases are present only seasonally. Most small birds have flexible diets that emphasize specific types of plant or animal material during certain seasons and most species are opportunistic, feeding on whatever food source is most abundant or particularly nutritious/palatable at a given time. A generalized avian receptor, represented by the American robin (*Turdus migratorius*), was selected to represent the herbivorous/omnivorous feeding guild. An area use factor of 100 percent per EPA (1997) and a 5.2% incidental soil ingestion rate (Beyer, et al., 1994) were conservatively assumed.

- Avian Carnivores. Representative avian predators (raptors) for the Site include the red-tailed hawk (*Buteo jamaicensis*) although it has not been observed at the Site. It, however, may use the Site for hunting prey occasionally. Large avian carnivores (red-tailed hawk) feed primarily on small rodents, snakes, and lizards although they are opportunistic and will feed on other prey at times. An area use factor of 100 percent per EPA (1997) and a 2% incidental soil ingestion rate (Beyer, et al., 1994) were conservatively assumed.

3.1.2 Estuarine Wetland and Aquatic Receptors

- Benthos. Polychaetes (*Capitella capitata)* burrow in and ingest sediment and have a greater exposure potential to sediment-bound chemicals than most epibenthos organisms such as shrimp and crab. Polychaetes are likely to be the most abundant class of benthic organisms found in the Intracoastal Waterway and, as such, polychaetes (*Capitella capitata)* was chosen as the ROPC to represent this receptor class.

- Fish and Shellfish. Fiddler crabs (*Uca rapax*) and killifish (*Fundulus grandis*) were chosen as the ROPC to represent herbivorous or omnivorous species in the estuarine wetland and aquatic ecosystems, respectively. Fiddler crabs and their burrows are abundant at the Site. They eat detritus (dead or decomposing plant and animal matter) and serve as a food source for many wetland animals. It was assumed that their area use factor is 100 percent. The killifish was chosen to represent this feeding guild because it is likely to be present in the area of the Site and because it is an omnivorous fish that feeds primarily on organic detritus, small crustaceans, zooplankton, epiphytic algae, and polychaetes (*Capitella capitata)*. Killifish may inhabit the Site for its entire life cycle; therefore, an area use factor of 100 percent was assumed.

- Carnivorous Fish. Black drum (*Pogonias cranius*) was selected as the first order carnivore ROPC because it is present in the Intracoastal Waterway and because it is an omnivorous carnivore that eats shrimp, crabs, small fish, benthic worms and algae. Per EPA (1997), an area use factor of 100 percent was conservatively assumed. The spotted seatrout (*Cynoscion nebulosus*) was chosen to represent a second order carnivorous fish species because it is present in the Intracoastal Waterway and because adult fish feed almost exclusively on other fish. It was conservatively assumed that the area use factor for the spotted seatrout is 100 percent per EPA (1997).

- Avian Carnivores. Sandpipers (*Calidris genus*) were chosen as first order avian carnivore ROPC because they have been observed at the Site. Although not observed at the Site, the green heron (*Butorides striatus*) was chosen as the second order avian predator ROPC to assess food chain impacts. Sandpipers are migratory birds that feed on aquatic insects and larva, marine worms, small crabs, small mollusks, and other invertebrate prey items. An area use factor of 100 percent was conservatively assumed per EPA (1997). Green herons are migratory birds that feed on small fish, invertebrates, insects, frogs, and other small animals. Per EPA (1997), an area use factor of 100 percent was conservatively assumed for second order avian carnivore (green heron) as well. Both were assumed to have an incidental sediment ingestion rate of 2% of dietary intake (Beyer, et al., 1994).

3.2 SCREENING-LEVEL EXPOSURE ESTIMATES

In the exposure analysis, potential exposure of ecological receptors to COPECs was quantified. There are two basic routes of exposure for the COPECs and receptors at the Site: 1) ingestion from food, soil/sediment, and surface water; and 2) direct contact with soil, sediment, and surface water containing the COPECs. Quantification of exposure potential for both of these exposure routes requires data on chemical concentrations in environmental media (e.g., soil, sediment, prey items) and ingestion rates or contact information for each receptor and pathway. In addition, body weights, home range size, and other factors must be known for each of the receptors, as well as the chemical and physical properties of the COPECs.

Ecological receptors based on an ingestion pathway include birds, crustaceans, mammals, and fish. Receptors evaluated based on direct contact include invertebrates (earthworms) in the terrestrial ecosystem and polychaetes (*Capitella capitata)* and amphipods in the wetlands/aquatic ecosystem. Tables 22 and 23 provide exposure parameters for each receptor for terrestrial and estuarine wetland/aquatic receptors, respectively. In most instances, exposure parameters were chosen from regulatory or peer-reviewed literature and maximum ingestion rates and minimum body weights were preferentially used, when available. Best professional judgment was used when information for a ROPC was not available. References for the selected values are shown in the tables and the reference citations are included in Section 6.0.

Exposures via inhalation or dermal absorption were not evaluated for most receptors because of a lack of appropriate exposure and toxicity data and the uncertainty associated with these pathways (TNRCC, 2001). The exposure of animals to contaminants in soil by dermal contact is likely to be small due to barriers of fur, feathers, and epidermis. Therefore, the SLERA focused on the ingestion pathways as the primary exposure route for all vertebrates (unless direct contact was specifically noted and assessed).

For most receptors evaluated based on ingestion, exposure was quantified by estimating the daily dose (mg COPEC/kg body weight per day) that the receptor is expected to receive via both incidental soil/sediment ingestion and through dietary intake from food items, prey and surface water. For the direct contact with soil or sediment pathway (i.e., invertebrates (earthworms) and polychaetes (*Capitella capitata*)), the maximum COPEC concentration in soil or sediment was used directly to estimate exposure. Terrestrial receptors in the upland North and South areas were assumed to obtain freshwater drinking water from sources other than brackish surface water in the wetlands, ponds, and Intracoastal Waterway, so exposure to COPECs in site surface water was not included as part of their daily dose.

EPA guidance (EPA, 1997) suggests conservatively using maximum concentrations in the SLERA, which is often performed when only limited data sets are available. During the scoping meeting with EPA, it was discussed that a 95% upper confidence limit (UCL) on the average concentration would more appropriately represent the exposure point concentration (EPC) given the extensive characterization and sampling that has been conducted at the Site during the RI. The general procedure that is recommended by EPA to estimate a 95% UCL (EPA, 2002a) was used as the EPC to represent the upper end of exposure. EPA's ProUCL Version 4.04 program (EPA, 2009a) was used to analyze dataset distribution and calculate 95% UCL concentrations. ProUCL calculates various estimates of the 95% UCL of the mean, and then makes a recommendation on which one should be selected as the best UCL estimate. If the 95% UCL is greater than the maximum detected concentration, the maximum measured concentration was used as the exposure point concentration (EPA, 2002).

Appendix A provides the ProUCL output when there were sufficient samples to run statistics (soil and sediment). It should be noted that for avian receptors, the exposure point concentration was based on surface soil data because it is unlikely that the avian ROPC is exposed to subsurface soils given their habitat preferences, activities, and feeding behavior. There were not enough surface water samples for statistical calculations so maximum measured concentrations were used in the evaluation for surface water.

Dose estimates using the 95% UCL EPC were used to represent exposure for non-sedentary receptors and were used in the dose calculations for the non-sedentary receptors. It should be noted, however, that 95% UCLs were not used in Section 2 to identify COPECS, and that exceedances shown on Figures 6 through 15 are based on point-by-point comparisons to ecological screening levels. Maximum concentrations were used as the EPC for intake (dose) calculations for sedentary receptors.

The general equation used for estimating COPEC dose from the various environmental media (i.e., soil, sediment, or surface water) and food ingestion pathways is presented below:

For an environmental media pathway:

$$\mathrm{Dose}_{medium} = \frac{C_{medium} \text{ x } IR_{medium} \text{ x } AF_{medium} \text{ x } AUF}{BW}$$

For a food pathway:

$$\mathrm{Dose}_{food} = \frac{C_{food} \text{ x } IR_{food} \text{ x } AUF}{BW}$$

Where:

C_{medium} = chemical concentration in the environmental medium (soil, sediment, or surface water) (mg/kg)

C_{food} = chemical concentration in food (mg/kg)

IR_{medium} = ingestion rate of the particular environmental medium (kg/day)

IR_{food} = food ingestion rate (kg/day)

AF_{medium} = chemical bioavailability factor for the environmental medium (usually, soil or sediment) (unitless)

AUF = area-use factor (unitless)

BW = wildlife receptor body weight (kg)

It should be noted that the chemical bioavailability factor for all compounds in both soil and sediment was conservatively assumed to be 1 (i.e., 100% bioavailable for uptake). COPEC concentrations in food were estimated from soil, sediment, or surface water concentrations using bioaccumulation factors (BAFs) biota-sediment accumulation factors (BSAFs), or bioconcentration factors (BCFs), respectively, with the following equation:

$$C_{food} = C_{medium} \text{ x BAF (or BSAF, if sediment; or BCF, if surface water)}$$

For those terrestrial receptors exposed through soil and dietary exposure routes, the dose was assumed to be additive with the equation:

$$Dose_{total} = Dose_{soil} + Dose_{food}$$

For those aquatic/estuarine receptors exposed through sediment, surface water and dietary exposure routes, the dose was assumed to be additive with the equation:

$$Dose_{total} = Dose_{sediment} + Dose_{surface\ water} + Dose_{food}$$

Various literature sources, including the Wildlife Exposure Factors Handbook (EPA, 1993), were reviewed to determine the types and amounts of prey ingested by the wildlife receptors. Appendices C through I provide detailed intake (dose) calculations for each medium and all receptors.

3.3 TOXICITY REFERENCE VALUES

Species-specific toxicity reference values (TRVs) were determined using scientific literature and other available resources with selected benchmarks generally based on measurements of survival, growth or reproduction in the laboratory. A TRV was selected from the available scientific literature for each compound using the following criteria (EPA, 1997):

- Doses based on the receptor species selected for evaluation were used preferentially; however, if toxicity information was not available for the species, doses for animals within the same class as the receptor species were used.
- Data for reproductive or developmental effects were used preferentially over other endpoints. Reproductive and developmental effects represent a more sensitive measure of wildlife effects than mortality. Therefore, these effects were chosen in preference to the less sensitive mortality endpoint for assessing ecological risk to the ROPCs.
- Chronic data were used preferentially to sub-chronic or acute data, and no observed adverse effects levels (NOAELs) were used in preference to lowest observed adverse effects levels (LOAELs) and effects measurements.

ERL values were used as sediment TRVs for benthic receptors. If the hazard quotient (HQ) was greater than 1 for a given compound, an alternate HQ was calculated using the midpoint between the ERL and ERM to provide additional information about potential ecological risks to benthic receptors. In several instances, an Apparent Effects Threshold (AET) was used as the TRV because an ERL was not available. TRVs were not available for each receptor class or for each compound. Where appropriate, surrogate values were used within some chemical classes (e.g., 4,4'-DDT for 4,4'-DDE) for chemicals without TRVs but no species to species extrapolations were conducted. Because using surrogate values introduces considerable uncertainty into the risk assessment process, care was taken to only use surrogate values for chemicals with similar chemical structures or toxicities to minimize the uncertainty. The chemicals with no TRVs are discussed in the uncertainty section.

3.4 SCREENING-LEVEL HAZARD QUOTIENTS

The purpose of the risk characterization is to integrate the exposure and ecological effects analyses to determine if ecological receptors at the Site are potentially at risk from chemical exposure. In this section, the dose estimate is compared to the TRV to evaluate the potential for adverse health effects to the ROPC using a hazard quotient approach. The HQ is a ratio of the estimated exposure concentration to the TRV where:

$$HQ = Dose / TRV$$

If the HQ is less than one, indicating the exposure concentration or dose is less than the TRV, adverse effects are considered highly unlikely. If the HQ is equal to or greater than one, a potential for adverse effects may exist. It should be noted that an HQ greater than one by itself does not indicate the magnitude or effect nor does it provide a measure of potential population-level effects (Menzie et al., 1992), and certainly should be evaluated based on the conservative nature of the assumptions. HQs were calculated for individual PAHs as well as for total PAHs, LPAHs, and HPAHs. PAHs were classified as LPAH or HPAH according to Box 3-6 of TCEQ guidance (TCEQ, 2001).

Instead of using food chain dose equations to compute HQs for fish in the Intracoastal Waterway, whole-body concentrations in fish were estimated with literature BSAFs and BCFs for exposure to COPECs in sediment and surface water, respectively. These predicted whole-body concentrations were compared to literature studies that linked tissue residue concentrations in fish to adverse effects (Jarvinen and Ankley, 1999). The concentrations in the referenced document are reported in µg/g wet weight, so they were converted to mg/kg dry weight by dividing the wet-weight concentration by 0.8 (i.e., 20 percent moisture; Jarvinen and Ankley, 1999) before comparison to predicted concentrations. However, the referenced document does not contain whole-body concentrations for most of the detected COPECs. Details are provided in Sections 3.4.4 and 3.4.5 below.

Tables 24 and 25 provide a summary of the HQs that exceed one for soil and sediment, respectively, for each receptor and COPEC. Mercury, selenium and thallium are contaminants that are considered bioaccumulative and that were measured above sample detection limits in Site surface water. Thus, these contaminants were evaluated for surface water food chain effects. No other bioaccumulative surface water contaminants listed in Table 3-1 of TCEQ, 2006 were detected in Site surface water samples.

Appendices C through I provide the complete set of calculations for all compounds and whole-body fish concentrations estimated from exposure to sediment and surface water via BSAFs and BCFs, respectively. A discussion of the results for each compound with a HQ greater than one follows for each media.

3.4.1 South Area Soil

As shown in Table 24, the NOAEL-based HQs using maximum measured concentrations for 4,4’-DDD, 4,4’-DDE, 4,4’-DDT, Aroclor-1254, barium, chromium, copper, zinc and total HPAH exceed one for the invertebrate (earthworm) receptor. NOAEL-based HQs for higher trophic level receptors were less than one. Ingestion of Site surface water was not included in dose equations because the water is saline and it was, therefore, assumed that mobile terrestrial receptors were not drinking water from the Intracoastal Waterway.

3.4.2 North Area Soil

As shown in Table 24, the NOAEL-based HQs using maximum measured concentrations for 4,4’-DDT, Aroclor-1254, barium, chromium, copper, and zinc exceed one for the invertebrate (earthworm) receptor. NOAEL-based HQs for higher trophic level receptors were less than one. Ingestion of Site surface water was not included in dose equations because the water is saline and it was, therefore, assumed that mobile terrestrial receptors were not drinking water from the wetlands or pond surface water.

3.4.3 Background Area Soil

As shown in Table 24, NOAEL-based HQs using maximum measured concentrations for barium and zinc exceed one for the invertebrate (earthworm) receptor. NOAEL-based HQs for higher trophic level receptors were less than one. Ingestion of Site surface water was not included in dose equations because the water is saline and it was, therefore, assumed that mobile terrestrial receptors were not drinking water from surrounding wetlands.

3.4.4 Intracoastal Waterway Sediment and Surface Water

As shown in Table 25, the ERL-based HQs using maximum concentrations for 4,4'-DDT, acenaphthene, benzo(a)anthracene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, hexachlorobenzene, phenanthrene, pyrene, LPAHs, HPAHs, and total PAHs exceed one for the benthic receptor. The only benchmark available for hexachlorobenzene was the AET, and the HQ exceeded one for benthic organisms. All HQs are five or less.

The midpoint between the ERL/ERM-based HQ for dibenz(a,h)anthracene was 1.5; none of the other compounds or PAH groupings exceeded the midpoint of the ERL/ERM on a point-by-point comparison. As shown in Figure 9, dibenz(a,h)anthracene was measured in two sediment samples collected from the Intracoastal Waterway above the ERL with the concentration in one of these samples above the midpoint between the ERL and ERM.

None of the NOAEL-based HQs was above one for avian carnivores (sandpiper and green heron).

There are no bioaccumulative COPECs detected in the surface water of the Site-related Intracoastal Waterway. Of the metal COPECs detected in surface water and considered potentially toxic to fish (i.e., aluminum, chromium, copper, manganese, silver, and vanadium), there are no data available in the Jarvinen and Ankley (1999) document for whole-body concentration effects to salt-water fish. Among studies of four salt-water species, the lowest DDT concentration linked to adverse effects is more than four orders of magnitude greater than the predicted whole-body fish concentration based on Site data. A single study of hexachlorobenzene was found that indicated a whole-body concentration related to significant reduced survival in a salt-water fish species is more than 2,500 times greater than the predicted whole-body fish concentration based on Site data. A single study of benzo(a)pyrene was found that indicated a whole-body concentration related to significantly reduced survival in a salt-water fish species that is about 250 times greater than the predicted whole-body fish concentration based on Site data. No other applicable information was found in the Jarvinen and Ankley (1999) document for COPECs detected in sediment and surface water of the Site-related Intracoastal Waterway.

3.4.5 Intracoastal Waterway Background Sediment and Surface Water

As shown in Table 25, the ERL-based HQs using maximum measured concentrations for arsenic and nickel exceeded one. Sample-by-sample comparisons with screening levels are presented on Figure 10. None of the NOAEL-based HQs was above one for avian carnivores (sandpiper and green heron).

The maximum measured concentration of 4,4’-DDT, and the only detection, in surface water collected from the background area of the Intracoastal Waterway was 1.30×10^{-5} mg/L. It was not detected in any Site-related surface water samples. The detection is about 13-fold greater than the TSWQS of 1.00×10^{-6} mg/L. The maximum measured concentration of dissolved silver in surface water was 0.0058 mg/L. It was not detected in the surface water samples from the Site-related area of the Intracoastal Waterway or the wetlands. All detections are greater than the TCEQ ecological benchmark value of 0.00019 mg/L, the maximum being about 31 times greater. There is neither a TSWQS nor a recommended national water quality criterion from the EPA (2009b) for chronic marine exposures. The TCEQ ecological benchmark value is derived from the EPA (2009b) acute marine recommended water quality criterion divided by a safety factor of 10.

Among studies of four salt-water species, the lowest DDT concentration linked to adverse effects is about five times greater than the predicted whole-body fish concentration summed from sediment and surface water. No other applicable information was found in the Jarvinen and Ankley (1999) document for COPECs detected in sediment and surface water of the background area of the Intracoastal Waterway.

3.4.6 North Area Wetlands Sediment and Surface Water

As shown in Table 25, the ERL-based HQ using the maximum measured concentration for many individual PAHs, 4,4’-DDT, arsenic, copper, endrin aldehyde, endrin ketone, gamma-chlordane, lead, nickel, zinc, LPAHs, HPAHs, and total PAHs exceed one for the benthic receptor. There is not an ERL for benzo(g,h,i)perylene or indeno(1,2,3-cd)pyrene. The AET-based HQs for benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene were 2.9 and 3.2, respectively, using a maximum concentration as the EPC for the benthic scenario.

Using the midpoint between the ERL/ERM and maximum measured concentrations, HQs exceeded one for 2-methylnaphthalene (1.2), acenaphthylene (1.6), benzo(a)anthracene (1.1), benzo(a)pyrene (1.3), chrysene (2.5), dibenz(a,h)anthracene (18), lead (1.8), phenanthrene (1.5), zinc (3.2), and HPAH (2.5). None of the other compounds exceeded the midpoint of the ERL/ERM using maximum measured concentrations.

None of the NOAEL-based HQs exceed one for the avian carnivores (sandpiper and green heron).

As shown in Figure 11, a point-by-point comparison indicates that several compounds are measured in individual samples above the midpoint of the ERL/ERM (highlighted in yellow). These exceedances include: 2-methylnaphthalene, acenaphthylene, chrysene, dibenz(a,h)anthracene, gamma-Chlordane, lead, phenanthrene, pyrene, zinc, and HPAHs. Compounds exceeding the ERL, but below the midpoint of the ERL/ERM, are shown as non-highlighted values in Figure 11.

Acrolein was measured (0.00929 mg/L) in one of four wetland surface water samples. It was not detected in any surface water samples from the Intracoastal Waterway or the two ponds. The single detection is greater than the TCEQ ecological benchmark value of 0.005 mg/L by less than a factor of two. There is neither a TSWQS nor a recommended national water quality criterion from the EPA (2009b) for chronic marine exposures. The maximum measured concentration of dissolved copper in wetland surface water was 0.011 mg/L. It was not detected in any surface water samples from the Intracoastal Waterway or the two ponds. The maximum concentration is greater than the TSWQS of 0.0036 mg/L by about three-fold.

Among studies of four salt-water species, the lowest DDT concentration linked to adverse effects is more than three orders of magnitude greater than the predicted whole-body fish concentration. Among studies of three salt-water species, the lowest endosulfan concentration linked to adverse effects is nearly 100 times greater than the predicted whole-body fish concentration. In two studies of a single salt-water species, the endrin concentration linked to adverse effects is more than 350 times greater than the predicted whole-body fish concentration for endrin aldehyde and more than 2,000 times greater than the predicted whole-body fish concentration. A single study of benzo(a)pyrene was found that indicated a whole-body concentration related to significant reduced survival in a salt-water fish species is about ten times greater than the predicted whole-body fish concentration. No other applicable information was found in the Jarvinen and Ankley

(1999) document for COPECs detected in sediment and surface water of the background area of the Intracoastal Waterway.

3.4.7 Pond Sediment and Surface Water

As shown in Table 25, the ERL-based HQs for 4,4'-DDT and zinc exceed one for the benthic receptor using maximum measured concentrations. The midpoint of the ERL/ERM HQ for zinc exceeds one for the benthic scenario using a maximum measured concentration.

The NOAEL-based HQ for lead slightly exceeds one (1.2) for the avian carnivore (sandpiper) receptor but not the avian carnivore (green heron) receptor.

As shown in Figure 12, a point-by-point comparison indicates that zinc was measured in three samples above the midpoint of the ERL/ERM. All three samples with zinc measured above the ERL/ERM midpoint were collected from the Small Pond.

The maximum measured concentration of dissolved silver in Pond surface water was 0.0029 mg/L. It was not detected in the surface water samples from the Site-related area of the Intracoastal Waterway or the wetlands. All detections are greater than the TCEQ ecological screening benchmark value, the maximum being about 15 times greater. There is neither a TSWQS nor a recommended national water quality criterion from the EPA (2009b) for chronic marine exposures. The TCEQ ecological benchmark value is derived from the EPA (2009b) acute marine recommended water quality criterion divided by a safety factor of 10.

Among studies of four salt-water species, the lowest DDT concentration linked to adverse effects is more than 250 times greater than the predicted whole-body fish concentration. A single study of benzo(a)pyrene was found that indicated a whole-body concentration related to significant reduced survival in a salt-water fish species is about 15 times greater than the predicted whole-body fish concentration. No other applicable information was found in the Jarvinen and Ankley (1999) document for COPECs detected in sediment and surface water of the background area of the Intracoastal Waterway.

4.0 UNCERTAINTY ANALYSIS FOR STEPS 1 AND 2

This section describes the uncertainties associated with the methodology and results of the SLERA. Risk assessments (both ecological and human) necessarily require assumptions and extrapolations within each step of the analysis and this can lead to uncertainty in predicted risks. These uncertainties are generally the result of limitations in the available scientific data used in the exposure and risk models as well as their applicability to the Site. Accordingly, the key assumptions and uncertainties are thought to have the greatest influence on the ecological risks predicted for the Site and, as such, they are presented with a qualitative description of how the uncertainty may affect the evaluation and conclusions. This provides the risk manager with the appropriate context for understanding the level of confidence with the risk assessment results.

There are two principle sources of uncertainty – those resulting from natural variability and those resulting from data limitations. Both types of uncertainty are discussed as they relate to the three major steps of the SLERA: exposure assessment, effects characterization, and risk characterization.

4.1 EXPOSURE ANALYSIS UNCERTAINTY

This section primarily focuses on the uncertainties in the exposure analysis resulting from data limitations. There are three general categories of uncertainty that are discussed in this section: general exposure analysis uncertainties, receptor-specific uncertainties (i.e., uncertainties that are related to the receptors evaluated), and chemical specific uncertainties.

4.1.1 General Exposure Analysis Uncertainties

General exposure analysis uncertainties are those components of the exposure analysis that have not been or could not be well characterized for the assessment endpoints evaluated. Due to the conservative nature of the SLERA, it is believed that the overall impact of uncertainties related to the exposure analysis may result in an overestimate of risk.

Data collected at the Site satisfied the goals described in the Work Plan (PBW, 2006a) and, thus, adequately characterized the Site’s nature and extent of contamination. As described in the NEDR (PBW, 2009a), hundreds of samples of soil, sediment, and surface water were collected for the South Area, North Area, Intracoastal Waterway, and background soil, sediment, and surface water locations. Characterization was conducted for the entire Site and continued if a screening level was exceeded.

Overall, the data were determined to be of high quality. Data were collected and analyzed in accordance with approved procedures specified in the RI/FS Field Sampling Plan (PBW, 2006b) and were validated in accordance with approved validation procedures specified in the Quality Assurance Project Plan (QAPP) (PBW, 2006c). Very few of the data for any of the analytes were found to be unusable (ie., "R-flagged"). In instances where data were unusable, the analysis was conducted again (when possible) and the R-flagged datum was not used. Some of the data are qualified (ie., "J-flagged") as estimated because the measured concentration is above the sample detection limit but below the sample quantitation limit and/or due to minor quality control deficiencies. According to the *Guidance for Data Useability in Risk Assessment (Part A)* (EPA, 1992b), data that are qualified as estimated should be used for risk assessment purposes. Data quality was discussed in greater detail in the NEDR (PBW, 2009a).

In light of the thoroughness of the site characterization and because of the high quality data, it is believed that the calculated 95% UCL of the mean values accurately represent Site concentrations for chronic exposure conditions for non-sedentary receptors, such as those assumed in this evaluation, and that little uncertainty was incurred in the assessment due to incomplete site characterization. Organisms with home ranges smaller than the Site such as the invertebrate (earthworm) and small mammalian herbivore (deer mouse) for terrestrial receptors and polychaetes (*Capitella capitata*), fiddler crab, sandpiper, and green heron for aquatic/estuarine receptors may be exposed to a locally higher concentration than the 95% UCL. A point-by-point comparison was done to evaluate localized effects for the soil invertebrates and benthic receptors.

To assess impacts for groups of PAHs, such as total PAHs, LPAHs, and HPAHs, maximums and 95% UCLs were identified for each individual PAH and added to derive a total PAH, LPAH, or HPAH maximum or 95% UCL for the group of compounds. This may impart conservatism into the hazard quotient calculation because it assumes that the maximum measurement (or 95% UCL) for every PAH falls within the same sample. Total PAH, LPAH, and HPAH calculations were also conducted for each sample to ensure that an exceedance on a sample-by-sample basis was not inadvertently excluded from further evaluation.

The assumptions regarding ecological exposure on the South Area of the Site pose a conservative bias given that it was assumed that wildlife populations use and are exposed to the entire Site, and that these areas provide sufficient cover and/or foraging habitat to support these wildlife populations. The South Area was developed for industrial purposes and contains limited natural vegetative cover characteristic of viable ecological habitat. In many portions of the South Area, ground surface is covered by concrete slabs or the soil has been worked and there is a permeable cover such as gravel and/or oyster shell base that prevents nesting and foraging by many bird species, primarily insectivores and seed eaters. It should be noted, however, grasses and sparse weedy cover have grown since the operations at the Site have stopped, but this is a relatively small area when compared to the approximate 20-acre South Area. The developed and disturbed nature of the habitat at the South Area was not taken into consideration in the SLERA and, as such, risks are most likely overestimated for all receptors.

Appendix K provides additional information related to depth intervals for potential ecological receptor exposure in Site soils. This information was included in previous correspondence in a September 11, 2007 letter to EPA and was used to guide soil sampling activities during the RI.

The same general uncertainty as described above applies to the risks associated with sediment from the Intracoastal Waterway since the area of the Intracoastal Waterway near the Site does not provide suitable habitat to encourage or keep fish and other ecological receptors at the Site as noted by USFWS (USFWS, 2005a). This conclusion was supported by observations during the fish sampling program when it took several weeks to catch the required number of fish (27) in the Intracoastal Waterway at the Site using gill nets. Fish were more plentiful (and thus more readily caught) in the background area that contained a higher quality habitat (i.e., natural shoreline with vegetation in the background area compared to the sheetpile and concrete bulkheads).

4.1.2 Receptor-Specific Uncertainties

Receptor-specific uncertainties include those parameters in the dose equation that have not been directly measured for receptors at the Site. Receptor-specific uncertainties applicable to both terrestrial and aquatic/estuarine receptors include the body weights and food and environmental media ingestion rates used to quantify exposure estimates. Often, the incidental soil or sediment ingestion rate was assumed to be a fraction of dietary intake since an alimentary study was not available to describe soil or sediment ingestion. All receptors were assumed to have an incidental soil or sediment ingestion rate of 2% although the avian herbivore/omnivore (American robin) and small mammalian omnivore (least shrew) were assumed to have a 5.2% and 8% incidental soil ingestion rate (Beyer et al., 1994). Additionally, dietary fractions of all receptors were based on literature data. Many of the receptors evaluated in the SLERA, such as the small mammalian herbivore (deer mouse) and avian herbivore/omnivore (American robin), have been reasonably well studied so this was not considered a major uncertainty.

Per EPA guidance (EPA, 1997), it was assumed that the area use factor for all receptors was 100%, which most likely overestimates exposure and risk for the more mobile receptors such as the large avian carnivore (red-tailed hawk), large mammalian carnivore (coyote), and the avian carnivores (sandpiper and green heron) particularly given the small size of the Site relative to the home range of these species. The conservatism is compounded with receptors that consume prey items since it was assumed that 100% of their prey comes from the Site as well.

Fish were assumed to exist in the North Area wetlands and ponds and whole-body tissue concentrations of the COPECs were predicted from BSAFs and BCFs. However, the wetlands are often dry or barely inundated and it is believed, therefore, that fish do not inhabit these wetlands. Fish have not been observed in the ponds on several site visits. Therefore, modeling of exposure to fish is considered to be conservative.

Additional uncertainty may have occurred due to the species chosen to represent a guild and potential differences in their exposure patterns. It is believed, however, that the species chosen as the ROPC in the evaluation is similar enough to other species within a guild so that all are protected in the risk assessment process. It is difficult to predict the impact this uncertainty may have on overall risk predictions and conclusions.

4.1.3 Chemical-Specific Uncertainties

Chemical-specific uncertainties are those factors that are assumed for specific chemicals and generally relate to fate and transport modeling. These uncertainties should be considered in weighing the importance of the predicted risks for that chemical.

Bioaccumulation factors and biota-sediment accumulation factors were selected from available literature as noted in the toxicity tables provided in the appendices. They were not available for several of the compounds, and often the data available were sparse or of unknown quality. This makes assessing food chain effects in the evaluation difficult and sometimes uncertain. When appropriate, surrogate values for different chemicals and/or different receptors were used to allow for exposures to be estimated for fish and higher trophic level receptors when a COPEC-specific value was not available. This approach imparts uncertainty into the exposure assessment although it is difficult to discern whether it leads to an over-estimation or under-estimation of potential risks.

If a bioaccumulation factor was not available and an appropriate surrogate could not be identified, a conservative default value of 1 was used to allow for the compound to be included in predicting fish tissue concentrations and in the food chain calculations. This likely leads to an overestimation of exposure since many literature bioaccumulation factors are less than one. This allowed all compounds to be included in the food chain modeling.

Bioavailability was assumed to be 100% per EPA guidance (EPA, 1997), although it is well known that metals and some organic compounds are less than 100% bioavailable (EPA, 2007). This assumption leads to an overestimation of risks.

4.2 EFFECTS CHARACTERIZATION UNCERTAINTY

This section describes the assumptions inherent to the use of chemical-specific TRVs for chemicals evaluated in the terrestrial and aquatic/estuarine systems and chemical-specific ERLs/ERMs for chemicals evaluated for sediment-dwelling benthic organisms. PAHs in sediment, as discussed prior, were also evaluated as a class (total PAHs) and as subclasses (LPAHs and HPAHs). Tables 26, 27, and 28 identify whether a toxicity reference value is available for a given compound and receptor for soil, sediment, and surface water, respectively.

Most available toxicity data were for standard laboratory animals or domestic animals such as rats, mice, quail, and mallards. Thus, these animals were used as surrogates to represent the toxicity of chemicals to site-specific receptors. It is unknown how the sensitivities of these surrogate organisms to toxicants compare to the sensitivities of the wildlife receptors evaluated at the Site. Using surrogate TRVs, therefore, may over- or underestimate toxicity and estimated risk to receptors at the Site.

Toxicological data for a particular taxonomic class was not extrapolated for use by a different taxonomic class (e.g., using TRVs from birds for reptiles or from a plant species for invertebrates (earthworms)). Differences in physiology are believed to be great enough as to introduce too much uncertainty in such extrapolations. A qualitative discussion of predicted whole-body tissue concentrations was used to evaluate fish. Reptiles were not evaluated in a quantitative manner. However, there is no toxicological information that indicates source-related chemicals would produce greater toxicity to reptiles than to other evaluated guilds. Snakes have been observed at the Site and it is very likely that there are food resources available to support a snake population although the habitat at the South Area is not ideal. The terrestrial areas of the North Area likely provide ideal habitat for snakes although shallow groundwater may make subsurface conditions unfavorable for burrowing. It is unlikely that this receptor guild is more exposed or more at risk than the other receptors evaluated in the risk assessment.

The lack of screening values and toxicity data for several compounds imparts uncertainty on the evaluation although it is difficult to determine the significance of the uncertainty. It appears, however, that screening values and/or TRVs were available for the more toxic (relatively) and prevalent compounds (both frequency and concentration) at the Site.

The exception to this is for surface water. Many compounds measured in surface water did not have ecological screening values, chronic marine TSWQS, or EPA national recommended water quality criteria. Often, lack of such standards or criteria is an indication that not enough is yet known about the toxic effects of the chemical or compound and/or the chemical is classified by the EPA as a non-priority pollutant. Uncertainty, therefore, is associated with the benchmark value or screening level used in lieu of a better-researched standard or criterion. It follows, then, that conservatism would generally be included in a benchmark value or screening level that may create an overestimation of potential risks. For example, the ecological benchmark value for chronic marine exposures to dissolved silver may be conservative because the value was derived by dividing the EPA national recommended water quality criterion for acute marine exposures by a safety factor of 10. The COPECs for which toxicological screening values exist were included in surface water ingestion exposure pathways.

There are uncertainties in the PAH ERLs/ERMs used to assess risk to benthos. These values are based on effects to growth, survival, and/or benthic community indices for (largely) field collected sediments across the United States and should be used only as a screening tool (Long et al., 1995). The use of field collected sediments imparts uncertainty in the establishment of these screening benchmarks and in any subsequent evaluation of sediment risk using these values because these sediments also contain concentrations of other chemicals that will affect sediment toxicity. The differences between the toxicity observed in the studies used to develop the ERLs/ERMs and site-specific measures of toxicity may be remarkable as observed at several site-specific studies where higher concentrations of PAHs did not result in toxicity (Alcoa, 2000 and Paine et al., 1996).

The AETs used to characterize risk for hexachlorobenzene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene are based on screening sediment benchmarks developed for Puget Sound using a bivalve study, a Microtox assay, and a Microtox assay, respectively (Buchman, 2008). Sediment toxicity is highly variable based on local sediment conditions and, therefore, predictions of risk from screening values can vary greatly.

4.3 RISK CHARACTERIZATION UNCERTAINTY

This section discusses uncertainties related to the risk characterization and the methodology used to estimate risk. The most significant general uncertainty associated with risk characterization is how exposure to multiple chemicals was evaluated. Except for PAHs, which are discussed below, additivity of effects to the various receptors from exposure to the multiple chemicals measured at the Site was not appropriate since these chemicals, for the most part, act via different mechanisms of toxicity. Furthermore, no evidence was found in the scientific literature to suggest that the toxicity of the compounds measured at the Site should be considered additive. Likewise, some toxic effects from metals are antagonistic but these effects were not considered either since the exact mechanism is not well understood toxicologically nor is there an accepted method for quantifying this type of interaction in the risk assessment.

For PAHs, potential effects were assumed to be additive and, as such, risks were estimated for total PAHs, LPAHs, HPAHs, and for individual compounds as well. This multi-pronged evaluation increases the confidence in the risk predictions as it provides for several lines of evidence to draw conclusions.

In making comparisons between predicted whole-body fish concentrations and concentrations linked to adverse effects in the literature (Jarvinen and Ankley, 1999), there were no studies available for many of the COPECs. However, fish concentrations predicted from the maximum measured concentration in the surface water and 95% UCL concentrations in the sediment were mostly one to several orders of magnitude less than the concentrations linked to adverse effects in the literature when comparisons could be made. Therefore, it is believed that the trend would hold true for the other COPECs.

Background risks were estimated in a manner identical for Site-related risks for soil and Intracoastal Waterway sediment. Potential ecological risks from compounds measured in soil from the South Area and North Area, as shown in Table 24, were very similar for site-related barium and zinc when compared to the background area.

5.0 SUMMARY AND CONCLUSIONS OF THE SLERA

The SLERA is to be used to assess the need and, if required, the level of effort required to conduct a baseline ecological risk assessment, or to determine that no further action is necessary. The SLERA is to also be used to focus subsequent phases of the investigation by eliminating compounds from further evaluation (EPA, 2001). This section presents the summary and conclusions of the SLERA.

The SLERA evaluated the potential for unacceptable risk for terrestrial and aquatic/estuarine receptors as a result of direct (incidental ingestion) and indirect (bioaccumulation/biomagnifications through the food chain) exposure to chemicals measured in soil, sediment, surface water at the Site. Direct toxicity to surface water, as well as the bioconcentration of COPECs in surface water, was evaluated for the aquatic receptors. For bioaccumulative surface water contaminants, food chain effects were also evaluated.

Summaries of all soil and sediment HQs greater than one are provided in Tables 24 and 25 for soil and sediment, respectively, while Appendices C through I provide detailed risk characterization calculations for all compounds. It should be noted that HQs for all sedentary receptors were based on maximum measured concentrations while HQs for mobile receptors were based on 95% UCL concentrations. Appendix J provides a list of all references cited in Appendices A though I.

5.1. <u>Potential Ecological Risks Associated with Soil</u>

Several of the risk calculations for soil invertebrates (earthworms) result in an HQ greater than one using the NOAEL as the TRV and maximum measured concentrations in soil from the South Area, North Area and background area, as shown on Table 24. The HQs for the other COPECS or receptors not listed in this table were below 1. Figures 6A, 6B, 6C, 6D, 7A, 7B, 7C, and 8 show a point-by-point comparison for compounds exceeding the screening criteria for the compounds listed in Table 24.

Based on the HQs greater than one, adverse effects related to direct toxicity to soil invertebrates are possible as a result of exposure to 4,4’-DDE, 4,4’-DDD, 4,4’-DDT, Aroclor-1254, barium, chromium, copper, zinc and total HPAHs in South Area soil. The NOAEL-based HQs for higher trophic level receptors were less than one for South Area soils which suggests that adverse risks to higher trophic level receptors exposed to soil at the Site are unlikely.

Based on the HQs greater than one, adverse effects related to direct toxicity to soil invertebrates are possible as a result of exposure to 4,4'-DDT, Aroclor-1254, barium, chromium, copper, and zinc in North Area soil. The NOAEL-based HQs for higher trophic level receptors were less than one for North Area soils which suggests that adverse risks to higher trophic level receptors exposed to soil at the Site are unlikely.

Based on the HQs greater than one, adverse effects related to direct toxicity to soil invertebrates are possible as a result of exposure to barium and zinc in background soil. The NOAEL-based HQs for higher trophic level receptors were less than one for background area soils which suggests that adverse risks to higher trophic level receptors exposed to soil at the Site are unlikely.

5.2. Potential Ecological Risks Associated with Sediment and Surface Water

Figures 9, 10, 11, and 12 provide a sample-by-sample evaluation of sediments and show which compounds exceed their screening criteria. Table 25 summarizes the HQs that exceed one; these HQs were estimated using maximum concentrations for benthic receptors and 95% UCL concentrations for the higher trophic-level receptors. Figures 13, 14, and 15 respectively show surface water concentrations of COPECs in the background Intracoastal Waterway, wetlands area, and ponds that were measured in excess of their screening levels. There is not a figure for Site surface water samples collected from the Intracoastal Waterway since none of the compounds measured above detection limits in these samples exceeded its screening criteria.

5.2.1 Intracoastal Waterway

As shown in Table 25, the sediment ERL-based HQs using maximum concentrations for 4,4'-DDT, acenaphthene, benzo(a)anthracene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, hexachlorobenzene, phenanthrene, pyrene, LPAHs, HPAHs, and total PAHs exceed one for the benthic receptor. Figure 9 shows a sample-by-sample comparison of compounds measured in sediment that exceed their benthic screening levels. Dibenz(a,h)anthracene was measured at a concentration greater than the midpoint of the ERL/ERM in one of sixteen samples.

Hexachlorobenzene was measured in the same sample at a concentration greater than the AET, which was the only available benchmark for that compound.

HQs for the avian carnivores (sandpiper and green heron) that include the exposure pathways of sediment, surface water, and food ingestion were less than one.

No compounds were measured in excess of their screening criteria in Site Intracoastal Waterway surface water, and bioaccumulative compounds were evaluated with surface water ingestion and food chain dose equations. Whole-body fish tissue concentrations predicted from concentrations of COPECs in sediment and surface water via BSAFs and BCFs, respectively, are at least 250 times less than literature studies (Jarvinen and Ankley, 1999) that link whole-body fish tissue concentrations to adverse effects in salt-water species.

There may be the potential for adverse impacts to sedentary biota communities in sediment from the COPECs that exceed their ERL-based HQs. These COPECs will be further evaluated in a BERA. Adverse impacts from COPECs in surface water are not anticipated. Adverse impacts to mobile receptors from COPECs in sediment, surface water, and food items are not likely.

5.2.2 Background Intracoastal Waterway

The only compounds that exceeded their screening levels in sediment collected in the background area of the Intracoastal Waterway were arsenic and nickel, as shown in Table 25 and Figure 10.

HQs for the avian carnivores (sandpiper and green heron) that include the exposure pathways of sediment, surface water, and food ingestion were less than one.

4,4'-DDT and dissolved silver were measured in background Intracoastal Waterway surface water in excess of their surface water screening criteria (TSWQS and TCEQ ecological screening benchmark, respectively). 4,4'-DDT and 4,4'-DDD, both bioaccumulative compounds, were evaluated with surface water ingestion and food chain dose equations. Whole-body fish tissue concentrations predicted from concentrations of COPECs in sediment and surface water via BSAFs and BCFs, respectively, are at least five times less than literature studies (Jarvinen and Ankley, 1999) that link whole-body fish tissue concentrations to adverse effects in salt-water species.

There were no site-related detections of these two contaminants in Site surface water samples. Adverse impacts are not predicted from COPECs in the background area of the Intracoastal Waterway. Instead, COPEC concentrations may be used in the BERA to evaluate potential risks from the same COPECs in various Site areas.

5.2.3 North Area Wetlands

As shown in Table 25, the sediment ERL- or AET-based HQs exceeded one for 4,4'-DDT, a number of individual PAHs, LPAHs, HPAHs, total PAHs, endrin aldehyde, endrin ketone, gamma-chlordane, arsenic, copper, lead, nickel, and zinc for the benthic receptor using maximum measured concentrations. Figure 11 shows a sample-by-sample comparison of compounds measured in excess of their benthic screening levels. Using the midpoint between the ERL and ERM, HQs exceeded one for 2-methylnaphthalene, acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, lead, phenanthrene, zinc, and HPAH.

HQs for the avian carnivores (sandpiper and green heron) that include the exposure pathways of sediment, surface water, and food ingestion were less than one.

Acrolein and dissolved copper were measured in wetland surface water samples in excess of their surface water screening criteria (TCEQ ecological screening benchmark and TSWQS, respectively). Mercury, a bioaccumulative compound, was evaluated with surface water ingestion and food chain dose equations. Whole-body fish tissue concentrations predicted from concentrations of COPECs in sediment and surface water via BSAFs and BCFs, respectively, are between 10 and 2,000 times less than literature studies (Jarvinen and Ankley, 1999) that link whole-body fish tissue concentrations to adverse effects in salt-water species.

There may be the potential for adverse impacts to sedentary biota communities in sediment from the COPECs that exceed their ERL- or AET-based HQs. These COPECs will be further evaluated in a BERA. This conclusion is supported by an ERM-Quotient approach as described in Long et al. (1998) that resulted in probabilities of toxicity to benthic organisms which exhibited a gradient of results that exceeded 20% for multiple locations. A summary of the results for the mean ERM-Quotient approach is:

Sample Location	ERM-Quotient	Probability of Toxicity
2WSED4	0.68	56%
2WSED17	0.55	52%
NB4SE08	0.37	45%
NF4SE13	0.16	28%
NB2SE06	0.04	3%

There may be the potential for adverse impacts to biota communities (except fish) in surface water from the COPECs that exceed their water quality screening benchmarks or state standards. These COPECs will be further evaluated in a BERA. Adverse impacts to mobile receptors from COPECs in sediment, surface water, and food items are not anticipated.

5.2.4 Ponds

As shown in Table 25, the ERL-based HQs for 4,4'-DDT and zinc were greater than one for the benthic receptor using a maximum measured concentration. Figure 12 shows each sample location where a compound was measured in excess of a screening level and the associated concentration.

One of the avian carnivores (sandpiper) had a HQ that slightly exceeded one (1.2) from lead via the exposure pathways of sediment, surface water, and food ingestion.

Dissolved silver was measured in excess of its surface water screening criterion (TCEQ ecological screening benchmark). Selenium and thallium, both bioaccumulative compounds, were evaluated with surface water ingestion and food chain dose equations. Whole-body fish tissue concentrations predicted from concentrations of COPECs in sediment and surface water via BSAFs and BCFs, respectively, are between 15 and 250 times less than literature studies (Jarvinen and Ankley, 1999) that link whole-body fish tissue concentrations to adverse effects in salt-water species.

5.3 Scientific Management Decision Point

The SLERA concludes with a SMDP and the three possible decisions at this point according to EPA (EPA, 1997) are:

1. There is adequate information to conclude that ecological risks are negligible and therefore no need for remediation on the basis of ecological risk;
2. The information is not adequate to make a decision at this point, and the ecological risk assessment process will continue to Step 3; or
3. The information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted (i.e., continue to Step 3).

There may be the potential for adverse impacts to sedentary biota communities in soil from the COPECs that exceeded their NOAEL-based HQs in the South Area and North Area, and a more thorough assessment is warranted (i.e., continue to Step 3 of EPA's Ecological Risk Assessment Guidance for Superfund process). This conclusion is based on exceedances of protective ecological benchmarks for direct contact toxicity in soil of the South Area and North Area. Adverse effects resulting from soil ingestion and food chain exposure to higher trophic level receptors are unlikely.

The SLERA indicates a potential for localized adverse ecological effects to sedentary biota communities in sediment from the COPECs that exceeded the midpoint of the ERL/ERM, and a more thorough assessment is warranted (i.e., continue to Step 3 of EPA's Ecological Risk Assessment Guidance for Superfund process). This conclusion is based on exceedances of protective ecological benchmarks for direct contact toxicity in sediment of the North Area wetlands, Intracoastal Waterway and the Ponds. There may be the potential for adverse impacts to biota communities (except fish) in surface water from dissolved silver that exceeds its water quality screening benchmark in wetlands surface water. In addition, the SLERA concluded that there is a possible risk as the literature-based food chain hazard quotient for lead in the Small Pond exceeded unity and from direct toxicity to aquatic species due to acrolein and dissolved copper in the surface water of the North Area wetlands and silver in the surface water of the Ponds. Adverse effects resulting from sediment ingestion, surface water and food chain exposures to other higher trophic level receptors are unlikely.

Identification of COPECs for the BERA is one of the primary objectives of the SLERA. Table 29 summarizes the compounds and media that will be discussed and evaluated further in the Problem Formulation report for the BERA.

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APPENDIX A

PRO UCL OUTPUT

APPENDIX A-1

SOUTH OF MARLIN SURFACE SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . \ProUCL data analysis\S of Marlin-SURFACE soil\S of Marlin-SURFACE soil_ProUCL input.
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2-Methylnaphthalene

Total Number of Data	83
Number of Non-Detect Data	61
Number of Detected Data	**22**
Minimum Detected	0.0106
Maximum Detected	0.501
Percent Non-Detects	**73.49%**
Minimum Non-detect	0.00946
Maximum Non-detect	0.106
Mean of Detected Data	0.0806
Median of Detected Data	0.0349
Variance of Detected Data	0.0156
SD of Detected Data	0.125
CV of Detected Data	1.552
Skewness of Detected Data	2.773
Mean of Detected log data	-3.184
SD of Detected Log data	1.075

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0297
SD	0.0701
Standard Error of Mean	0.00789
95% KM (t) UCL	0.0428
95% KM (z) UCL	0.0427
95% KM (BCA) UCL	0.0465
95% KM (Percentile Bootstrap) UCL	0.0436
95% KM (Chebyshev) UCL	0.0641
97.5% KM (Chebyshev) UCL	**0.079**
99% KM (Chebyshev) UCL	0.108

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

4,4'-DDD

Total Number of Data	83
Number of Non-Detect Data	78
Number of Detected Data	**5**

Minimum Detected	0.00264
Maximum Detected	0.0243
Percent Non-Detects	**93.98%**
Minimum Non-detect	2.35E-04
Maximum Non-detect	0.00276
Mean of Detected Data	0.0097
Median of Detected Data	0.00401
Variance of Detected Data	8.64E-05
SD of Detected Data	0.0093
CV of Detected Data	0.959
Skewness of Detected Data	1.266
Mean of Detected log data	-5.005
SD of Detected Log data	0.95

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00307
SD	0.00264
Standard Error of Mean	3.24E-04
95% KM (t) UCL	0.0036
95% KM (z) UCL	0.0036
95% KM (BCA) UCL	0.0138
95% KM (Percentile Bootstrap) UCL	0.00485
95% KM (Chebyshev) UCL	0.00448
97.5% KM (Chebyshev) UCL	0.00509
99% KM (Chebyshev) UCL	0.00629

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.00027**
[per recommendation in ProUCL User Guide]

4,4'-DDE

Total Number of Data	83
Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	4.28E-04
Maximum Detected	0.0693
Percent Non-Detects	**79.52%**
Minimum Non-detect	3.26E-04

Maximum Non-detect	0.0163

Mean of Detected Data	0.00765
Median of Detected Data	0.0022
Variance of Detected Data	2.81E-04
SD of Detected Data	0.0168
CV of Detected Data	2.193
Skewness of Detected Data	3.524
Mean of Detected log data	-6.02
SD of Detected Log data	1.385

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00192
SD	0.00792
Standard Error of Mean	8.96E-04
95% KM (t) UCL	0.00341
95% KM (z) UCL	0.00339
95% KM (BCA) UCL	0.00382
95% KM (Percentile Bootstrap) UCL	0.00365
95% KM (Chebyshev) UCL	0.00583
97.5% KM (Chebyshev) UCL	**0.00752**
99% KM (Chebyshev) UCL	0.0108

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

4,4'-DDT

Total Number of Data	83
Number of Non-Detect Data	46
Number of Detected Data	**37**
Minimum Detected	2.81E-04
Maximum Detected	0.0625
Percent Non-Detects	**55.42%**
Minimum Non-detect	1.25E-04
Maximum Non-detect	0.00626

Mean of Detected Data	0.00835
Median of Detected Data	0.00304
Variance of Detected Data	1.58E-04
SD of Detected Data	0.0126
CV of Detected Data	1.506
Skewness of Detected Data	2.7
Mean of Detected log data	-5.808
SD of Detected Log data	1.551

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	70
Number treated as Detected	13
Single DL Percent Detection	84.34%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00389
SD	0.0092
Standard Error of Mean	0.00102
95% KM (t) UCL	0.00559
95% KM (z) UCL	0.00558
95% KM (BCA) UCL	0.00567
95% KM (Percentile Bootstrap) UCL	0.0057
95% KM (Chebyshev) UCL	0.00836
97.5% KM (Chebyshev) UCL	**0.0103**
99% KM (Chebyshev) UCL	0.0141

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Acenaphthene

Total Number of Data	83
Number of Non-Detect Data	57
Number of Detected Data	**26**
Minimum Detected	0.0113
Maximum Detected	1.69
Percent Non-Detects	**68.67%**
Minimum Non-detect	0.0087
Maximum Non-detect	0.0975
Mean of Detected Data	0.168
Median of Detected Data	0.072
Variance of Detected Data	0.114
SD of Detected Data	0.337
CV of Detected Data	2.009
Skewness of Detected Data	4.078
Mean of Detected log data	-2.641
SD of Detected Log data	1.211

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	73
Number treated as Detected	10
Single DL Percent Detection	87.95%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0608
SD	0.199

Standard Error of Mean	0.0222
95% KM (t) UCL	0.0978
95% KM (z) UCL	0.0974
95% KM (BCA) UCL	0.11
95% KM (Percentile Bootstrap) UCL	0.102
95% KM (Chebyshev) UCL	0.158
97.5% KM (Chebyshev) UCL	**0.2**
99% KM (Chebyshev) UCL	0.282

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Acenaphthylene

Total Number of Data	83
Number of Non-Detect Data	64
Number of Detected Data	**19**
Minimum Detected	0.0184
Maximum Detected	0.935
Percent Non-Detects	**77.11%**
Minimum Non-detect	0.00986
Maximum Non-detect	0.11
Mean of Detected Data	0.135
Median of Detected Data	0.072
Variance of Detected Data	0.0414
SD of Detected Data	0.204
CV of Detected Data	1.503
Skewness of Detected Data	3.708
Mean of Detected log data	-2.521
SD of Detected Log data	0.954

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7
Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0455
SD	0.107
Standard Error of Mean	0.012
95% KM (t) UCL	0.0655
95% KM (z) UCL	0.0653
95% KM (BCA) UCL	0.082
95% KM (Percentile Bootstrap) UCL	0.0704
95% KM (Chebyshev) UCL	0.098
97.5% KM (Chebyshev) UCL	**0.121**
99% KM (Chebyshev) UCL	0.165

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Aluminum

Number of Valid Observations	83
Number of Distinct Observations	79
Minimum	414
Maximum	15200
Mean	5335
Median	4650
SD	3345
Variance	11191315
Coefficient of Variation	0.627
Skewness	0.744
Mean of log data	8.345
SD of log data	0.757

95% Useful UCLs	
Student's-t UCL	**5946**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	5971
95% Modified-t UCL	5951
Non-Parametric UCLs	
95% CLT UCL	5939
95% Jackknife UCL	5946
95% Standard Bootstrap UCL	5943
95% Bootstrap-t UCL	6001
95% Hall's Bootstrap UCL	5973
95% Percentile Bootstrap UCL	5960
95% BCA Bootstrap UCL	6000
95% Chebyshev(Mean, Sd) UCL	6936
97.5% Chebyshev(Mean, Sd) UCL	7628
99% Chebyshev(Mean, Sd) UCL	8989

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	83
Number of Non-Detect Data	46
Number of Detected Data	**37**
Minimum Detected	0.0112
Maximum Detected	2.46
Percent Non-Detects	**55.42%**
Minimum Non-detect	0.00982
Maximum Non-detect	0.107
Mean of Detected Data	0.203
Median of Detected Data	0.0886
Variance of Detected Data	0.175
SD of Detected Data	0.418
CV of Detected Data	2.06
Skewness of Detected Data	4.761
Mean of Detected log data	-2.479
SD of Detected Log data	1.282

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	65
Number treated as Detected	18
Single DL Percent Detection	78.31%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0971
SD	0.291
Standard Error of Mean	0.0324
95% KM (t) UCL	0.151
95% KM (z) UCL	0.15
95% KM (BCA) UCL	0.158
95% KM (Percentile Bootstrap) UCL	0.156
95% KM (Chebyshev) UCL	0.238
97.5% KM (Chebyshev) UCL	**0.299**
99% KM (Chebyshev) UCL	0.419

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Antimony

Total Number of Data	83
Number of Non-Detect Data	48
Number of Detected Data	**35**
Minimum Detected	1.13
Maximum Detected	5.14
Percent Non-Detects	**57.83%**
Minimum Non-detect	0.19
Maximum Non-detect	0.43

Mean of Detected Data	2.372
Median of Detected Data	2.17
Variance of Detected Data	0.831
SD of Detected Data	0.912
CV of Detected Data	0.384
Skewness of Detected Data	1.014
Mean of Detected log data	0.796
SD of Detected Log data	0.372

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	1.654
SD	0.847
Standard Error of Mean	0.0943
95% KM (t) UCL	1.811
95% KM (z) UCL	1.809
95% KM (BCA) UCL	1.872

95% KM (Percentile Bootstrap) UCL	1.845
95% KM (Chebyshev) UCL	2.065
97.5% KM (Chebyshev) UCL	**2.242**
99% KM (Chebyshev) UCL	2.592

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Aroclor-1254

Total Number of Data	85
Number of Non-Detect Data	73
Number of Detected Data	**12**
Minimum Detected	0.0109
Maximum Detected	7.98
Percent Non-Detects	**85.88%**
Minimum Non-detect	0.00325
Maximum Non-detect	0.0381

Mean of Detected Data	0.967
Median of Detected Data	0.144
Variance of Detected Data	5.039
SD of Detected Data	2.245
CV of Detected Data	2.321
Skewness of Detected Data	3.277
Mean of Detected log data	-1.66
SD of Detected Log data	1.897

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	9
Single DL Percent Detection	89.41%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.146
SD	0.873
Standard Error of Mean	0.099
95% KM (t) UCL	0.31
95% KM (z) UCL	0.309
95% KM (BCA) UCL	0.401
95% KM (Percentile Bootstrap) UCL	0.342
95% KM (Chebyshev) UCL	0.577
97.5% KM (Chebyshev) UCL	**0.764**
99% KM (Chebyshev) UCL	1.13

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Arsenic

Total Number of Data	83
Number of Non-Detect Data	12

Number of Detected Data	**71**
Minimum Detected	0.26
Maximum Detected	24.3
Percent Non-Detects	**14.46%**
Minimum Non-detect	0.17
Maximum Non-detect	1.44
Mean of Detected Data	4.313
Median of Detected Data	2.93
Variance of Detected Data	16.5
SD of Detected Data	4.062
CV of Detected Data	0.942
Skewness of Detected Data	2.522
Mean of Detected log data	1.106
SD of Detected Log data	0.882

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	23
Number treated as Detected	60
Single DL Percent Detection	27.71%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	27.71%
Mean	2.801
SD	1.229
95% Winsor (t) UCL	3.029
Kaplan Meier (KM) Method	
Mean	3.739
SD	3.984
Standard Error of Mean	0.44
95% KM (t) UCL	4.472
95% KM (z) UCL	4.463
95% KM (BCA) UCL	4.578
95% KM (Percentile Bootstrap) UCL	4.49
95% KM (Chebyshev) UCL	5.659
97.5% KM (Chebyshev) UCL	**6.49**
99% KM (Chebyshev) UCL	8.122

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Barium

Number of Valid Observations	83
Number of Distinct Observations	79
Minimum	18.6
Maximum	2180
Mean	345.2
Median	206
SD	349
Variance	121792
Coefficient of Variation	1.011
Skewness	2.74
Mean of log data	5.482
SD of log data	0.84

95% Useful UCLs	
Student's-t UCL	408.9
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	420.5
95% Modified-t UCL	410.9
Non-Parametric UCLs	
95% CLT UCL	408.2
95% Jackknife UCL	408.9
95% Standard Bootstrap UCL	407.6
95% Bootstrap-t UCL	422
95% Hall's Bootstrap UCL	433.9
95% Percentile Bootstrap UCL	411
95% BCA Bootstrap UCL	425.9
95% Chebyshev(Mean, Sd) UCL	512.2
97.5% Chebyshev(Mean, Sd) UCL	**584.4**
99% Chebyshev(Mean, Sd) UCL	726.4

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Benzo(a)anthracene

Total Number of Data	83
Number of Non-Detect Data	53
Number of Detected Data	**30**
Minimum Detected	0.0286
Maximum Detected	5.02
Percent Non-Detects	**63.86%**
Minimum Non-detect	0.0089
Maximum Non-detect	0.0998
Mean of Detected Data	0.936
Median of Detected Data	0.573
Variance of Detected Data	1.21
SD of Detected Data	1.1
CV of Detected Data	1.175
Skewness of Detected Data	2.02
Mean of Detected log data	-0.895
SD of Detected Log data	1.505

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	60
Number treated as Detected	23
Single DL Percent Detection	72.29%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.357
SD	0.783
Standard Error of Mean	0.0874
95% KM (t) UCL	0.502

95% KM (z) UCL	0.501
95% KM (BCA) UCL	0.521
95% KM (Percentile Bootstrap) UCL	0.509
95% KM (Chebyshev) UCL	0.738
97.5% KM (Chebyshev) UCL	**0.903**
99% KM (Chebyshev) UCL	1.226

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(a)pyrene

Total Number of Data	83
Number of Non-Detect Data	18
Number of Detected Data	**65**
Minimum Detected	0.0103
Maximum Detected	4.57
Percent Non-Detects	**21.69%**
Minimum Non-detect	0.00886
Maximum Non-detect	0.0984
Mean of Detected Data	0.575
Median of Detected Data	0.0887
Variance of Detected Data	1.014
SD of Detected Data	1.007
CV of Detected Data	1.751
Skewness of Detected Data	2.332
Mean of Detected log data	-2.005
SD of Detected Log data	1.79

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	52
Number treated as Detected	31
Single DL Percent Detection	62.65%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.453
SD	0.914
Standard Error of Mean	0.101
95% KM (t) UCL	0.621
95% KM (z) UCL	0.619
95% KM (BCA) UCL	0.624
95% KM (Percentile Bootstrap) UCL	0.628
95% KM (Chebyshev) UCL	0.894
97.5% KM (Chebyshev) UCL	**1.085**
99% KM (Chebyshev) UCL	1.459

Potential UCL to Use ______

Benzo(b)fluoranthene

Total Number of Data	83

Number of Non-Detect Data	22
Number of Detected Data	**61**
Minimum Detected	0.0408
Maximum Detected	5.42
Percent Non-Detects	**26.51%**
Minimum Non-detect	0.00677
Maximum Non-detect	0.147
Mean of Detected Data	0.784
Median of Detected Data	0.21
Variance of Detected Data	1.421
SD of Detected Data	1.192
CV of Detected Data	1.52
Skewness of Detected Data	2.244
Mean of Detected log data	-1.212
SD of Detected Log data	1.393

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	36
Single DL Percent Detection	56.63%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.588
SD	1.065
Standard Error of Mean	0.118
95% KM (t) UCL	0.784
95% KM (z) UCL	0.782
95% KM (BCA) UCL	0.823
95% KM (Percentile Bootstrap) UCL	0.793
95% KM (Chebyshev) UCL	1.102
97.5% KM (Chebyshev) UCL	1.324
99% KM (Chebyshev) UCL	1.76

Potential UCL to Use
95% KM (Chebyshev) UCL **1.102**

Benzo(g,h,i)perylene

Total Number of Data	83
Number of Non-Detect Data	34
Number of Detected Data	**49**
Minimum Detected	0.00989
Maximum Detected	4.24
Percent Non-Detects	**40.96%**
Minimum Non-detect	0.00887
Maximum Non-detect	1.03
Mean of Detected Data	0.502
Median of Detected Data	0.114
Variance of Detected Data	0.744
SD of Detected Data	0.863
CV of Detected Data	1.719

Skewness of Detected Data	2.664
Mean of Detected log data	-1.881
SD of Detected Log data	1.582

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7
Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.304
SD	0.699
Standard Error of Mean	0.0776
95% KM (t) UCL	0.433
95% KM (z) UCL	0.432
95% KM (BCA) UCL	0.441
95% KM (Percentile Bootstrap) UCL	0.436
95% KM (Chebyshev) UCL	0.643
97.5% KM (Chebyshev) UCL	**0.789**
99% KM (Chebyshev) UCL	1.076

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Benzo(k)fluoranthene

Total Number of Data	83
Number of Non-Detect Data	50
Number of Detected Data	**33**
Minimum Detected	0.0195
Maximum Detected	4.25
Percent Non-Detects	**60.24%**
Minimum Non-detect	0.0137
Maximum Non-detect	0.153

Mean of Detected Data	0.583
Median of Detected Data	0.228
Variance of Detected Data	0.722
SD of Detected Data	0.85
CV of Detected Data	1.458
Skewness of Detected Data	2.793
Mean of Detected log data	-1.499
SD of Detected Log data	1.5

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	64
Number treated as Detected	19
Single DL Percent Detection	77.11%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.244
SD	0.595
Standard Error of Mean	0.0663
95% KM (t) UCL	0.354
95% KM (z) UCL	0.353
95% KM (BCA) UCL	0.359
95% KM (Percentile Bootstrap) UCL	0.356
95% KM (Chebyshev) UCL	0.533
97.5% KM (Chebyshev) UCL	**0.658**
99% KM (Chebyshev) UCL	0.904

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Beryllium

Total Number of Data	83
Number of Non-Detect Data	1
Number of Detected Data	**82**
Minimum Detected	0.014
Maximum Detected	4.6
Percent Non-Detects	**1.20%**
Minimum Non-detect	0.0031
Maximum Non-detect	0.0031

Mean of Detected Data	0.413
Median of Detected Data	0.325
Variance of Detected Data	0.277
SD of Detected Data	0.527
CV of Detected Data	1.275
Skewness of Detected Data	6.355
Mean of Detected log data	-1.306
SD of Detected Log data	0.991

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.991
Mean	0.366
SD	0.257
95% Winsor (t) UCL	0.413

Kaplan Meier (KM) Method	
Mean	0.408
SD	0.522
Standard Error of Mean	0.0577
95% KM (t) UCL	0.504
95% KM (z) UCL	0.503
95% KM (BCA) UCL	0.524
95% KM (Percentile Bootstrap) UCL	0.514
95% KM (Chebyshev) UCL	0.66
97.5% KM (Chebyshev) UCL	**0.768**
99% KM (Chebyshev) UCL	0.982

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Boron

Total Number of Data	83
Number of Non-Detect Data	49
Number of Detected Data	**34**
Minimum Detected	2.43
Maximum Detected	54.4
Percent Non-Detects	**59.04%**
Minimum Non-detect	0.95
Maximum Non-detect	15.3
Mean of Detected Data	9.961
Median of Detected Data	8.78
Variance of Detected Data	81.05
SD of Detected Data	9.003
CV of Detected Data	0.904
Skewness of Detected Data	3.951
Mean of Detected log data	2.084
SD of Detected Log data	0.622

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	5.559
SD	6.776
Standard Error of Mean	0.756
95% KM (t) UCL	6.817
95% KM (z) UCL	6.803
95% KM (BCA) UCL	7.256
95% KM (Percentile Bootstrap) UCL	7.074
95% KM (Chebyshev) UCL	8.856
97.5% KM (Chebyshev) UCL	10.28
99% KM (Chebyshev) UCL	13.08
Potential UCL to Use	
95% KM (t) UCL	6.817
95% KM (% Bootstrap) UCL	**7.074**

Butyl benzyl phthalate

Total Number of Data	83
Number of Non-Detect Data	77
Number of Detected Data	**6**
Minimum Detected	0.0129
Maximum Detected	0.297
Percent Non-Detects	**92.77%**
Minimum Non-detect	0.0109
Maximum Non-detect	0.123

Mean of Detected Data	0.0956
Median of Detected Data	0.0359
Variance of Detected Data	0.013
SD of Detected Data	0.114
CV of Detected Data	1.193
Skewness of Detected Data	1.455
Mean of Detected log data	-2.959
SD of Detected Log data	1.207

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.019
SD	0.0352
Standard Error of Mean	0.00424
95% KM (t) UCL	0.0261
95% KM (z) UCL	0.026
95% KM (BCA) UCL	0.0493
95% KM (Percentile Bootstrap) UCL	0.0415
95% KM (Chebyshev) UCL	0.0375
97.5% KM (Chebyshev) UCL	0.0455
99% KM (Chebyshev) UCL	0.0612

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.01250**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data	83
Number of Non-Detect Data	33
Number of Detected Data	**50**
Minimum Detected	0.023
Maximum Detected	9.71
Percent Non-Detects	**39.76%**
Minimum Non-detect	0.017
Maximum Non-detect	0.052

Mean of Detected Data	0.764
Median of Detected Data	0.47

Variance of Detected Data	1.948
SD of Detected Data	1.396
CV of Detected Data	1.828
Skewness of Detected Data	5.725
Mean of Detected log data	-0.79
SD of Detected Log data	0.942

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	34
Number treated as Detected	49
Single DL Percent Detection	40.96%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	40.96%
Mean	0.189
SD	0.112
95% Winsor (t) UCL	0.211

Kaplan Meier (KM) Method	
Mean	0.469
SD	1.132
Standard Error of Mean	0.126
95% KM (t) UCL	0.678
95% KM (z) UCL	0.676
95% KM (BCA) UCL	0.751
95% KM (Percentile Bootstrap) UCL	0.707
95% KM (Chebyshev) UCL	1.016
97.5% KM (Chebyshev) UCL	**1.253**
99% KM (Chebyshev) UCL	1.718

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Carbazole

Total Number of Data	83
Number of Non-Detect Data	54
Number of Detected Data	**29**
Minimum Detected	0.0104
Maximum Detected	1.54
Percent Non-Detects	**65.06%**
Minimum Non-detect	0.00864
Maximum Non-detect	0.0967

Mean of Detected Data	0.157
Median of Detected Data	0.0855
Variance of Detected Data	0.0927
SD of Detected Data	0.304
CV of Detected Data	1.94
Skewness of Detected Data	3.888
Mean of Detected log data	-2.751
SD of Detected Log data	1.285

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	70
Number treated as Detected	13
Single DL Percent Detection	84.34%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.062
SD	0.19
Standard Error of Mean	0.0212
95% KM (t) UCL	0.0973
95% KM (z) UCL	0.0969
95% KM (BCA) UCL	0.107
95% KM (Percentile Bootstrap) UCL	0.104
95% KM (Chebyshev) UCL	0.155
97.5% KM (Chebyshev) UCL	**0.195**
99% KM (Chebyshev) UCL	0.273

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Chromium

Number of Valid Observations	83
Number of Distinct Observations	75
Minimum	3.37
Maximum	136
Mean	16.08
Median	12.6
SD	15.7
Variance	246.5
Coefficient of Variation	0.977
Skewness	5.833
Mean of log data	2.58
SD of log data	0.568

95% Useful UCLs	
Student's-t UCL	18.94

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.09
95% Modified-t UCL	19.13

Non-Parametric UCLs	
95% CLT UCL	18.91
95% Jackknife UCL	18.94
95% Standard Bootstrap UCL	18.9
95% Bootstrap-t UCL	21.61
95% Hall's Bootstrap UCL	32
95% Percentile Bootstrap UCL	19.25
95% BCA Bootstrap UCL	20.82
95% Chebyshev(Mean, Sd) UCL	23.59
97.5% Chebyshev(Mean, Sd) UCL	**26.84**
99% Chebyshev(Mean, Sd) UCL	33.22

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Chrysene

Total Number of Data	83
Number of Non-Detect Data	27
Number of Detected Data	**56**
Minimum Detected	0.00932
Maximum Detected	4.87
Percent Non-Detects	**32.53%**
Minimum Non-detect	0.00842
Maximum Non-detect	0.0906
Mean of Detected Data	0.6
Median of Detected Data	0.16
Variance of Detected Data	0.927
SD of Detected Data	0.963
CV of Detected Data	1.604
Skewness of Detected Data	2.449
Mean of Detected log data	-1.726
SD of Detected Log data	1.665

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	50
Number treated as Detected	33
Single DL Percent Detection	60.24%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.409
SD	0.831
Standard Error of Mean	0.092
95% KM (t) UCL	0.562
95% KM (z) UCL	0.56
95% KM (BCA) UCL	0.562
95% KM (Percentile Bootstrap) UCL	0.567
95% KM (Chebyshev) UCL	0.81
97.5% KM (Chebyshev) UCL	**0.984**
99% KM (Chebyshev) UCL	1.324

Potential UCL to Use ______

Cobalt

Total Number of Data	83
Number of Non-Detect Data	1
Number of Detected Data	**82**
Minimum Detected	0.049
Maximum Detected	16
Percent Non-Detects	**1.20%**
Minimum Non-detect	0.025
Maximum Non-detect	0.025
Mean of Detected Data	3.75

Median of Detected Data	3.495
Variance of Detected Data	4.948
SD of Detected Data	2.224
CV of Detected Data	0.593
Skewness of Detected Data	2.276
Mean of Detected log data	1.135
SD of Detected Log data	0.731

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.731
Mean	3.617
SD	1.87
95% Winsor (t) UCL	3.959

Kaplan Meier (KM) Method	
Mean	3.706
SD	2.234
Standard Error of Mean	0.247
95% KM (t) UCL	4.116
95% KM (z) UCL	4.112
95% KM (BCA) UCL	4.111
95% KM (Percentile Bootstrap) UCL	4.129
95% KM (Chebyshev) UCL	4.781
97.5% KM (Chebyshev) UCL	**5.247**
99% KM (Chebyshev) UCL	6.161

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Copper

Number of Valid Observations	83
Number of Distinct Observations	78
Minimum	1.55
Maximum	216
Mean	27.98
Median	16.4
SD	35.35
Variance	1249
Coefficient of Variation	1.263
Skewness	3.794
Mean of log data	2.929
SD of log data	0.844

95% Useful UCLs	
Student's-t UCL	34.43

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	36.09
95% Modified-t UCL	34.7

Non-Parametric UCLs	
95% CLT UCL	34.36
95% Jackknife UCL	34.43
95% Standard Bootstrap UCL	34.31
95% Bootstrap-t UCL	38.14
95% Hall's Bootstrap UCL	39.6
95% Percentile Bootstrap UCL	35.32

95% BCA Bootstrap UCL	36.93
95% Chebyshev(Mean, Sd) UCL	44.89
97.5% Chebyshev(Mean, Sd) UCL	**52.21**
99% Chebyshev(Mean, Sd) UCL	66.58

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Dibenz(a,h)anthracene

Total Number of Data	83
Number of Non-Detect Data	47
Number of Detected Data	**36**
Minimum Detected	0.0639
Maximum Detected	1.64
Percent Non-Detects	**56.63%**
Minimum Non-detect	0.00846
Maximum Non-detect	0.0946
Mean of Detected Data	0.347
Median of Detected Data	0.143
Variance of Detected Data	0.148
SD of Detected Data	0.385
CV of Detected Data	1.109
Skewness of Detected Data	1.917
Mean of Detected log data	-1.528
SD of Detected Log data	0.938

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	54
Number treated as Detected	29
Single DL Percent Detection	65.06%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.187
SD	0.286
Standard Error of Mean	0.0319
95% KM (t) UCL	0.24
95% KM (z) UCL	0.239
95% KM (BCA) UCL	0.249
95% KM (Percentile Bootstrap) UCL	0.245
95% KM (Chebyshev) UCL	0.326
97.5% KM (Chebyshev) UCL	0.386
99% KM (Chebyshev) UCL	0.504

Potential UCL to Use

95% KM (t) UCL	0.24
95% KM (% Bootstrap) UCL	**0.245**

Dibenzofuran

Total Number of Data	83

Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	0.0167
Maximum Detected	0.821
Percent Non-Detects	**79.52%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.139
Mean of Detected Data	0.132
Median of Detected Data	0.0603
Variance of Detected Data	0.0456
SD of Detected Data	0.214
CV of Detected Data	1.623
Skewness of Detected Data	2.78
Mean of Detected log data	-2.684
SD of Detected Log data	1.02

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.041
SD	0.105
Standard Error of Mean	0.0119
95% KM (t) UCL	0.0607
95% KM (z) UCL	0.0605
95% KM (BCA) UCL	0.0723
95% KM (Percentile Bootstrap) UCL	0.0659
95% KM (Chebyshev) UCL	0.0927
97.5% KM (Chebyshev) UCL	0.115
99% KM (Chebyshev) UCL	0.159

Potential UCL to Use

95% KM (BCA) UCL	**0.0723**

Dieldrin

Total Number of Data	83
Number of Non-Detect Data	62
Number of Detected Data	**21**
Minimum Detected	2.43E-04
Maximum Detected	0.0205
Percent Non-Detects	**74.70%**
Minimum Non-detect	1.40E-04
Maximum Non-detect	0.00701
Mean of Detected Data	0.00336
Median of Detected Data	0.00138
Variance of Detected Data	2.95E-05
SD of Detected Data	0.00543
CV of Detected Data	1.617

Skewness of Detected Data	2.499
Mean of Detected log data	-6.547
SD of Detected Log data	1.257

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00104
SD	0.00299
Standard Error of Mean	3.36E-04
95% KM (t) UCL	0.0016
95% KM (z) UCL	0.00159
95% KM (BCA) UCL	0.00187
95% KM (Percentile Bootstrap) UCL	0.00163
95% KM (Chebyshev) UCL	0.00251
97.5% KM (Chebyshev) UCL	**0.00314**
99% KM (Chebyshev) UCL	0.00439

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Di-n-butyl phthalate

Total Number of Data	83
Number of Non-Detect Data	74
Number of Detected Data	**9**
Minimum Detected	0.0368
Maximum Detected	0.753
Percent Non-Detects	**89.16%**
Minimum Non-detect	0.0251
Maximum Non-detect	0.28

Mean of Detected Data	0.217
Median of Detected Data	0.0819
Variance of Detected Data	0.0586
SD of Detected Data	0.242
CV of Detected Data	1.117
Skewness of Detected Data	1.577
Mean of Detected log data	-2.084
SD of Detected Log data	1.12

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0566
SD	0.0938
Standard Error of Mean	0.0109
95% KM (t) UCL	0.0748
95% KM (z) UCL	0.0746
95% KM (BCA) UCL	0.0993
95% KM (Percentile Bootstrap) UCL	0.0819
95% KM (Chebyshev) UCL	0.104
97.5% KM (Chebyshev) UCL	**0.125**
99% KM (Chebyshev) UCL	0.166

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Endosulfan sulfate

Total Number of Data	83
Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	4.56E-04
Maximum Detected	0.0713
Percent Non-Detects	**79.52%**
Minimum Non-detect	2.65E-04
Maximum Non-detect	0.0133
Mean of Detected Data	0.00837
Median of Detected Data	0.00154
Variance of Detected Data	3.09E-04
SD of Detected Data	0.0176
CV of Detected Data	2.098
Skewness of Detected Data	3.28
Mean of Detected log data	-6.019
SD of Detected Log data	1.472

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00209
SD	0.00835

Standard Error of Mean	9.45E-04
95% KM (t) UCL	0.00366
95% KM (z) UCL	0.00364
95% KM (BCA) UCL	0.00421
95% KM (Percentile Bootstrap) UCL	0.00385
95% KM (Chebyshev) UCL	0.0062
97.5% KM (Chebyshev) UCL	0.00799
99% KM (Chebyshev) UCL	0.0115

Potential UCL to Use

95% KM (BCA) UCL	**0.00421**

Endrin aldehyde

Total Number of Data	83
Number of Non-Detect Data	61
Number of Detected Data	**22**
Minimum Detected	4.97E-04
Maximum Detected	0.0738
Percent Non-Detects	**73.49%**
Minimum Non-detect	3.36E-04
Maximum Non-detect	0.00374
Mean of Detected Data	0.00814
Median of Detected Data	0.00243
Variance of Detected Data	2.63E-04
SD of Detected Data	0.0162
CV of Detected Data	1.991
Skewness of Detected Data	3.585
Mean of Detected log data	-5.742
SD of Detected Log data	1.237

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7
Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.00253
SD	0.00882
Standard Error of Mean	9.91E-04
95% KM (t) UCL	0.00418
95% KM (z) UCL	0.00416
95% KM (BCA) UCL	0.00487
95% KM (Percentile Bootstrap) UCL	0.00446
95% KM (Chebyshev) UCL	0.00685
97.5% KM (Chebyshev) UCL	**0.00872**
99% KM (Chebyshev) UCL	0.0124

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Endrin ketone

Total Number of Data	83
Number of Non-Detect Data	66
Number of Detected Data	**17**
Minimum Detected	0.00123
Maximum Detected	0.02
Percent Non-Detects	**79.52%**
Minimum Non-detect	4.26E-04
Maximum Non-detect	0.021
Mean of Detected Data	0.00614
Median of Detected Data	0.0041
Variance of Detected Data	2.68E-05
SD of Detected Data	0.00518
CV of Detected Data	0.844
Skewness of Detected Data	1.296
Mean of Detected log data	-5.439
SD of Detected Log data	0.881

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00225
SD	0.00303
Standard Error of Mean	3.45E-04
95% KM (t) UCL	0.00283
95% KM (z) UCL	0.00282
95% KM (BCA) UCL	0.00319
95% KM (Percentile Bootstrap) UCL	0.00297
95% KM (Chebyshev) UCL	0.00376
97.5% KM (Chebyshev) UCL	**0.00441**
99% KM (Chebyshev) UCL	0.00569

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Fluoranthene

Total Number of Data	83
Number of Non-Detect Data	24
Number of Detected Data	**59**
Minimum Detected	0.0133
Maximum Detected	14.2
Percent Non-Detects	**28.92%**
Minimum Non-detect	0.0107
Maximum Non-detect	0.117
Mean of Detected Data	1.119
Median of Detected Data	0.24

Variance of Detected Data	4.976
SD of Detected Data	2.231
CV of Detected Data	1.994
Skewness of Detected Data	4.072
Mean of Detected log data	-1.32
SD of Detected Log data	1.802

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	36
Single DL Percent Detection	56.63%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.8
SD	1.931
Standard Error of Mean	0.214
95% KM (t) UCL	1.155
95% KM (z) UCL	1.151
95% KM (BCA) UCL	1.188
95% KM (Percentile Bootstrap) UCL	1.157
95% KM (Chebyshev) UCL	1.731
97.5% KM (Chebyshev) UCL	**2.135**
99% KM (Chebyshev) UCL	2.926

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Fluorene

Total Number of Data	83
Number of Non-Detect Data	55
Number of Detected Data	**28**
Minimum Detected	0.00945
Maximum Detected	1.11
Percent Non-Detects	**66.27%**
Minimum Non-detect	0.0086
Maximum Non-detect	0.0962

Mean of Detected Data	0.133
Median of Detected Data	0.0693
Variance of Detected Data	0.059
SD of Detected Data	0.243
CV of Detected Data	1.829
Skewness of Detected Data	3.384
Mean of Detected log data	-2.823
SD of Detected Log data	1.177

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	74
Number treated as Detected	9
Single DL Percent Detection	89.16%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0518
SD	0.15
Standard Error of Mean	0.0168
95% KM (t) UCL	0.0797
95% KM (z) UCL	0.0794
95% KM (BCA) UCL	0.0885
95% KM (Percentile Bootstrap) UCL	0.0819
95% KM (Chebyshev) UCL	0.125
97.5% KM (Chebyshev) UCL	**0.157**
99% KM (Chebyshev) UCL	0.219

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

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gamma-Chlordane

Total Number of Data	83
Number of Non-Detect Data	75
Number of Detected Data	**8**
Minimum Detected	7.10E-04
Maximum Detected	0.0156
Percent Non-Detects	**90.36%**
Minimum Non-detect	2.20E-04
Maximum Non-detect	0.011
Mean of Detected Data	0.00604
Median of Detected Data	0.00376
Variance of Detected Data	3.27E-05
SD of Detected Data	0.00572
CV of Detected Data	0.948
Skewness of Detected Data	1.091
Mean of Detected log data	-5.575
SD of Detected Log data	1.109

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00123
SD	0.00229
Standard Error of Mean	2.69E-04
95% KM (t) UCL	0.00167
95% KM (z) UCL	0.00167
95% KM (BCA) UCL	0.00414
95% KM (Percentile Bootstrap) UCL	0.00381
95% KM (Chebyshev) UCL	0.0024
97.5% KM (Chebyshev) UCL	**0.0029**
99% KM (Chebyshev) UCL	0.0039

Data appear Normal (0.05)
May want to try Normal UCLs

Indeno(1,2,3-cd)pyrene

Total Number of Data	83
Number of Non-Detect Data	20
Number of Detected Data	**63**
Minimum Detected	0.0634
Maximum Detected	6.49
Percent Non-Detects	**24.10%**
Minimum Non-detect	0.0142
Maximum Non-detect	0.158
Mean of Detected Data	0.616
Median of Detected Data	0.165
Variance of Detected Data	1.079
SD of Detected Data	1.039
CV of Detected Data	1.687
Skewness of Detected Data	3.54
Mean of Detected log data	-1.365
SD of Detected Log data	1.245

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	51
Number treated as Detected	32
Single DL Percent Detection	61.45%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.483
SD	0.928
Standard Error of Mean	0.103
95% KM (t) UCL	0.654
95% KM (z) UCL	0.652
95% KM (BCA) UCL	0.68
95% KM (Percentile Bootstrap) UCL	0.661
95% KM (Chebyshev) UCL	0.931
97.5% KM (Chebyshev) UCL	1.124
99% KM (Chebyshev) UCL	1.505

Potential UCL to Use

95% KM (Chebyshev) UCL	**0.931**

Iron

Number of Valid Observations	83
Number of Distinct Observations	73
Minimum	3450
Maximum	77100
Mean	16285
Median	13400
SD	11193
Variance	1.25E+08
Coefficient of Variation	0.687
Skewness	3.11
Mean of log data	9.548
SD of log data	0.52
95% Useful UCLs	
Student's-t UCL	18329
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	18754
95% Modified-t UCL	18399
Non-Parametric UCLs	
95% CLT UCL	18306
95% Jackknife UCL	18329
95% Standard Bootstrap UCL	18305
95% Bootstrap-t UCL	19144
95% Hall's Bootstrap UCL	19421
95% Percentile Bootstrap UCL	18450
95% BCA Bootstrap UCL	18967
95% Chebyshev(Mean, Sd) UCL	21640
97.5% Chebyshev(Mean, Sd) UCL	**23957**
99% Chebyshev(Mean, Sd) UCL	28509

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Lead

Number of Valid Observations	83
Number of Distinct Observations	80
Minimum	2.82
Maximum	643
Mean	69.61
Median	34.4
SD	112.8
Variance	12720
Coefficient of Variation	1.62
Skewness	3.653
Mean of log data	3.584
SD of log data	1.077
95% Useful UCLs	
Student's-t UCL	90.2
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	95.27

95% Modified-t UCL	91.03
Non-Parametric UCLs	
95% CLT UCL	89.97
95% Jackknife UCL	90.2
95% Standard Bootstrap UCL	89.8
95% Bootstrap-t UCL	101.1
95% Hall's Bootstrap UCL	96.41
95% Percentile Bootstrap UCL	91.07
95% BCA Bootstrap UCL	97.2
95% Chebyshev(Mean, Sd) UCL	123.6
97.5% Chebyshev(Mean, Sd) UCL	**146.9**
99% Chebyshev(Mean, Sd) UCL	192.8

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Lithium

Number of Valid Observations	83
Number of Distinct Observations	80
Minimum	0.65
Maximum	28
Mean	7.856
Median	6.44
SD	5.715
Variance	32.67
Coefficient of Variation	0.728
Skewness	1.032
Mean of log data	1.76
SD of log data	0.847
95% Useful UCLs	
Student's-t UCL	8.899
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	8.963
95% Modified-t UCL	8.911
Non-Parametric UCLs	
95% CLT UCL	8.887
95% Jackknife UCL	8.899
95% Standard Bootstrap UCL	8.865
95% Bootstrap-t UCL	9.016
95% Hall's Bootstrap UCL	8.939
95% Percentile Bootstrap UCL	8.92
95% BCA Bootstrap UCL	9.002
95% Chebyshev(Mean, Sd) UCL	10.59
97.5% Chebyshev(Mean, Sd) UCL	**11.77**
99% Chebyshev(Mean, Sd) UCL	14.1

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Manganese

Number of Valid Observations	83
Number of Distinct Observations	71
Minimum	59.3

Maximum	892
Mean	257.4
Median	224
SD	129.3
Variance	16726
Coefficient of Variation	0.502
Skewness	2.305
Mean of log data	5.455
SD of log data	0.426

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	281.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	284.6
95% Modified-t UCL	281.7
Non-Parametric UCLs	
95% CLT UCL	280.8
95% Jackknife UCL	281.1
95% Standard Bootstrap UCL	280.3
95% Bootstrap-t UCL	287
95% Hall's Bootstrap UCL	287.4
95% Percentile Bootstrap UCL	280.8
95% BCA Bootstrap UCL	285.5
95% Chebyshev(Mean, Sd) UCL	319.3
97.5% Chebyshev(Mean, Sd) UCL	346.1
99% Chebyshev(Mean, Sd) UCL	398.7

Potential UCL to Use

Use 95% Student's-t UCL	281.1
Or 95% Modified-t UCL	**281.7**

Mercury

Total Number of Data	83
Number of Non-Detect Data	46
Number of Detected Data	**37**
Minimum Detected	0.0032
Maximum Detected	0.66
Percent Non-Detects	**55.42%**
Minimum Non-detect	0.002
Maximum Non-detect	0.048
Mean of Detected Data	0.0447
Median of Detected Data	0.019
Variance of Detected Data	0.0119
SD of Detected Data	0.109
CV of Detected Data	2.445
Skewness of Detected Data	5.279
Mean of Detected log data	-4.004
SD of Detected Log data	1.162

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	76
Number treated as Detected	7

Single DL Percent Detection	91.57%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0222
SD	0.0748
Standard Error of Mean	0.00832
95% KM (t) UCL	0.0361
95% KM (z) UCL	0.0359
95% KM (BCA) UCL	0.0378
95% KM (Percentile Bootstrap) UCL	0.0375
95% KM (Chebyshev) UCL	0.0585
97.5% KM (Chebyshev) UCL	**0.0742**
99% KM (Chebyshev) UCL	0.105

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Molybdenum

Total Number of Data	83
Number of Non-Detect Data	12
Number of Detected Data	**71**
Minimum Detected	0.098
Maximum Detected	8.42
Percent Non-Detects	**14.46%**
Minimum Non-detect	0.068
Maximum Non-detect	0.078
Mean of Detected Data	1.521
Median of Detected Data	1
Variance of Detected Data	2.632
SD of Detected Data	1.622
CV of Detected Data	1.066
Skewness of Detected Data	2.021
Mean of Detected log data	-0.11
SD of Detected Log data	1.096

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	1.096
Mean	1.067
SD	0.956
95% Winsor (t) UCL	1.243

Kaplan Meier (KM) Method	
Mean	1.315
SD	1.572
Standard Error of Mean	0.174
95% KM (t) UCL	1.604
95% KM (z) UCL	1.601

95% KM (BCA) UCL	1.611
95% KM (Percentile Bootstrap) UCL	1.617
95% KM (Chebyshev) UCL	2.073
97.5% KM (Chebyshev) UCL	**2.4**
99% KM (Chebyshev) UCL	3.044

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Nickel

Number of Valid Observations	83
Number of Distinct Observations	67
Minimum	2.84
Maximum	36.7
Mean	11.64
Median	11.2
SD	4.938
Variance	24.38
Coefficient of Variation	0.424
Skewness	1.825
Mean of log data	2.373
SD of log data	0.411
95% Useful UCLs	
Student's-t UCL	12.54
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12.65
95% Modified-t UCL	12.56
Non-Parametric UCLs	
95% CLT UCL	12.53
95% Jackknife UCL	12.54
95% Standard Bootstrap UCL	12.53
95% Bootstrap-t UCL	12.7
95% Hall's Bootstrap UCL	12.84
95% Percentile Bootstrap UCL	12.58
95% BCA Bootstrap UCL	12.7
95% Chebyshev(Mean, Sd) UCL	14
97.5% Chebyshev(Mean, Sd) UCL	**15.02**
99% Chebyshev(Mean, Sd) UCL	17.03

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Phenanthrene

Total Number of Data	83
Number of Non-Detect Data	26
Number of Detected Data	**57**
Minimum Detected	0.0139
Maximum Detected	12.6
Percent Non-Detects	**31.33%**
Minimum Non-detect	0.0115
Maximum Non-detect	0.122
Mean of Detected Data	0.74
Median of Detected Data	0.154

Variance of Detected Data	3.32
SD of Detected Data	1.822
CV of Detected Data	2.463
Skewness of Detected Data	5.422
Mean of Detected log data	-1.59
SD of Detected Log data	1.565

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	51
Number treated as Detected	32
Single DL Percent Detection	61.45%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.513
SD	1.534
Standard Error of Mean	0.17
95% KM (t) UCL	0.796
95% KM (z) UCL	0.793
95% KM (BCA) UCL	0.814
95% KM (Percentile Bootstrap) UCL	0.825
95% KM (Chebyshev) UCL	1.254
97.5% KM (Chebyshev) UCL	**1.574**
99% KM (Chebyshev) UCL	2.203

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Pyrene

Total Number of Data	83
Number of Non-Detect Data	26
Number of Detected Data	**57**
Minimum Detected	0.0121
Maximum Detected	8.47
Percent Non-Detects	**31.33%**
Minimum Non-detect	0.0111
Maximum Non-detect	0.3
Mean of Detected Data	0.765
Median of Detected Data	0.206
Variance of Detected Data	1.966
SD of Detected Data	1.402
CV of Detected Data	1.832
Skewness of Detected Data	3.609
Mean of Detected log data	-1.517
SD of Detected Log data	1.658

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	62
Number treated as Detected	21
Single DL Percent Detection	74.70%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.532
SD	1.203
Standard Error of Mean	0.133
95% KM (t) UCL	0.753
95% KM (z) UCL	0.751
95% KM (BCA) UCL	0.781
95% KM (Percentile Bootstrap) UCL	0.772
95% KM (Chebyshev) UCL	1.112
97.5% KM (Chebyshev) UCL	**1.363**
99% KM (Chebyshev) UCL	1.857

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Selenium

Total Number of Data **83**

Dataset has no Detected Values.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.96

Silver

Total Number of Data **83**

Dataset has no Detected Values.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 1.98

Strontium

Number of Valid Observations	83
Number of Distinct Observations	76
Minimum	16.5
Maximum	527
Mean	70.61
Median	57.3
SD	63.98
Variance	4094
Coefficient of Variation	0.906
Skewness	5.044
Mean of log data	4.06
SD of log data	0.583

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	82.29

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	86.31
95% Modified-t UCL	82.94

Non-Parametric UCLs	
95% CLT UCL	82.16
95% Jackknife UCL	82.29
95% Standard Bootstrap UCL	82.12
95% Bootstrap-t UCL	91.51
95% Hall's Bootstrap UCL	139.9
95% Percentile Bootstrap UCL	82.73
95% BCA Bootstrap UCL	88.37
95% Chebyshev(Mean, Sd) UCL	101.2
97.5% Chebyshev(Mean, Sd) UCL	114.5
99% Chebyshev(Mean, Sd) UCL	140.5

Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**101.2**

Tin

Total Number of Data	83
Number of Non-Detect Data	64
Number of Detected Data	**19**
Minimum Detected	0.55
Maximum Detected	4.95
Percent Non-Detects	**77.11%**
Minimum Non-detect	0.46
Maximum Non-detect	1.02

Mean of Detected Data	1.666
Median of Detected Data	1.68
Variance of Detected Data	1.302
SD of Detected Data	1.141
CV of Detected Data	0.685
Skewness of Detected Data	1.434
Mean of Detected log data	0.301
SD of Detected Log data	0.671

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	72
Number treated as Detected	11
Single DL Percent Detection	86.75%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.806
SD	0.709
Standard Error of Mean	0.0799
95% KM (t) UCL	0.939
95% KM (z) UCL	0.938
95% KM (BCA) UCL	0.972
95% KM (Percentile Bootstrap) UCL	0.941

95% KM (Chebyshev) UCL	1.155
97.5% KM (Chebyshev) UCL	**1.305**
99% KM (Chebyshev) UCL	1.602

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Titanium

Number of Valid Observations	83
Number of Distinct Observations	71
Minimum	11.5
Maximum	645
Mean	29.8
Median	19.5
SD	69.4
Variance	4816
Coefficient of Variation	2.329
Skewness	8.71
Mean of log data	3.055
SD of log data	0.544

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	42.47
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	50.11
95% Modified-t UCL	43.68
Non-Parametric UCLs	
95% CLT UCL	42.33
95% Jackknife UCL	42.47
95% Standard Bootstrap UCL	42.36
95% Bootstrap-t UCL	93.11
95% Hall's Bootstrap UCL	87.11
95% Percentile Bootstrap UCL	44.76
95% BCA Bootstrap UCL	54.32
95% Chebyshev(Mean, Sd) UCL	63
97.5% Chebyshev(Mean, Sd) UCL	77.37
99% Chebyshev(Mean, Sd) UCL	105.6

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	**63**

Vanadium

Number of Valid Observations	83
Number of Distinct Observations	67
Minimum	5.42
Maximum	45.6
Mean	13.76
Median	12.9
SD	6.248
Variance	39.04
Coefficient of Variation	0.454
Skewness	2.186
Mean of log data	2.538

SD of log data	0.404
95% Useful UCLs	
Student's-t UCL	14.9
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.06
95% Modified-t UCL	14.93
Non-Parametric UCLs	
95% CLT UCL	14.89
95% Jackknife UCL	14.9
95% Standard Bootstrap UCL	14.9
95% Bootstrap-t UCL	15.11
95% Hall's Bootstrap UCL	15.17
95% Percentile Bootstrap UCL	14.9
95% BCA Bootstrap UCL	15.07
95% Chebyshev(Mean, Sd) UCL	16.75
97.5% Chebyshev(Mean, Sd) UCL	**18.04**
99% Chebyshev(Mean, Sd) UCL	20.58

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Zinc

Number of Valid Observations	83
Number of Distinct Observations	81
Minimum	12.3
Maximum	4770
Mean	601.2
Median	455
SD	672.8
Variance	452606
Coefficient of Variation	1.119
Skewness	3.386
Mean of log data	5.837
SD of log data	1.203
95% Useful UCLs	
Student's-t UCL	724.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	752
95% Modified-t UCL	728.6
Non-Parametric UCLs	
95% CLT UCL	722.7
95% Jackknife UCL	724.1
95% Standard Bootstrap UCL	723.1
95% Bootstrap-t UCL	762.3
95% Hall's Bootstrap UCL	818.2
95% Percentile Bootstrap UCL	734.3
95% BCA Bootstrap UCL	771.3
95% Chebyshev(Mean, Sd) UCL	923.1
97.5% Chebyshev(Mean, Sd) UCL	**1062**
99% Chebyshev(Mean, Sd) UCL	1336

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

APPENDIX A-2

SOUTH OF MARLIN SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\. . . . \Gulfco Superfund Site\revised HHRA\Gulfco Marlin South soil-all data_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,3,5-Trimethylbenzene

Total Number of Data	83
Number of Non-Detect Data	74
Number of Detected Data	**9**
Minimum Detected	2.67E-04
Maximum Detected	4.36
Percent Non-Detects	**89.16%**
Minimum Non-detect	7.40E-05
Maximum Non-detect	0.0101
Mean of Detected Data	0.91
Median of Detected Data	0.00104
Variance of Detected Data	3.269
SD of Detected Data	1.808
CV of Detected Data	1.987
Skewness of Detected Data	1.644
Mean of Detected log data	-5.26
SD of Detected Log data	3.875

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0989
SD	0.629
Standard Error of Mean	0.0732
95% KM (t) UCL	0.221
95% KM (z) UCL	0.219
95% KM (BCA) UCL	0.243

95% KM (Percentile Bootstrap) UCL	0.243
95% KM (Chebyshev) UCL	0.418
97.5% KM (Chebyshev) UCL	0.556
99% KM (Chebyshev) UCL	0.827

Potential UCL to Use
97.5% KM (Chebyshev) UCL **0.556**

2-Butanone

Total Number of Data	83
Number of Non-Detect Data	42
Number of Detected Data	**41**
Minimum Detected	9.92E-04
Maximum Detected	0.0226
Percent Non-Detects	**50.60%**
Minimum Non-detect	1.43E-04
Maximum Non-detect	0.12

Mean of Detected Data	0.00511
Median of Detected Data	0.00314
Variance of Detected Data	2.46E-05
SD of Detected Data	0.00496
CV of Detected Data	0.971
Skewness of Detected Data	1.975
Mean of Detected log data	-5.61
SD of Detected Log data	0.774

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.00329
SD	0.00401
Standard Error of Mean	4.58E-04
95% KM (t) UCL	0.00405
95% KM (z) UCL	0.00404
95% KM (BCA) UCL	0.00425
95% KM (Percentile Bootstrap) UCL	0.00414
95% KM (Chebyshev) UCL	0.00528
97.5% KM (Chebyshev) UCL	0.00615
99% KM (Chebyshev) UCL	0.00785

Potential UCL to Use
95% KM (t) UCL **0.00405**
95% KM (% Bootstrap) UCL **0.00414**

2-Hexanone

Total Number of Data	83
Number of Non-Detect Data	75
Number of Detected Data	**8**
Minimum Detected	0.00109
Maximum Detected	0.0207
Percent Non-Detects	**90.36%**
Minimum Non-detect	3.78E-04
Maximum Non-detect	0.317

Mean of Detected Data	0.00653
Median of Detected Data	0.00452
Variance of Detected Data	4.39E-05
SD of Detected Data	0.00662
CV of Detected Data	1.015
Skewness of Detected Data	1.707
Mean of Detected log data	-5.449
SD of Detected Log data	0.982

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.00165
SD	0.0026
Standard Error of Mean	3.16E-04
95% KM (t) UCL	0.00218
95% KM (z) UCL	0.00218
95% KM (BCA) UCL	0.00471
95% KM (Percentile Bootstrap) UCL	0.00417
95% KM (Chebyshev) UCL	0.00303
97.5% KM (Chebyshev) UCL	**0.00363**
99% KM (Chebyshev) UCL	0.0048

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

2-Methylnaphthalene

Total Number of Data	166
Number of Non-Detect Data	134
Number of Detected Data	**32**
Minimum Detected	0.0106
Maximum Detected	7.21
Percent Non-Detects	**80.72%**
Minimum Non-detect	0.00946
Maximum Non-detect	0.205
Mean of Detected Data	0.315
Median of Detected Data	0.0469
Variance of Detected Data	1.597
SD of Detected Data	1.264
CV of Detected Data	4.009
Skewness of Detected Data	5.582
Mean of Detected log data	-2.811
SD of Detected Log data	1.367

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	161
Number treated as Detected	5
Single DL Percent Detection	96.99%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0697
SD	0.559
Standard Error of Mean	0.0441
95% KM (t) UCL	0.143
95% KM (z) UCL	0.142
95% KM (BCA) UCL	0.16
95% KM (Percentile Bootstrap) UCL	0.155
95% KM (Chebyshev) UCL	0.262
97.5% KM (Chebyshev) UCL	0.345
99% KM (Chebyshev) UCL	0.508

Potential UCL to Use
95% KM (BCA) UCL **0.16**

4,4'-DDD

Total Number of Data	166
Number of Non-Detect Data	145
Number of Detected Data	**21**
Minimum Detected	3.69E-04

Maximum Detected	1.12
Percent Non-Detects	**87.35%**
Minimum Non-detect	2.35E-04
Maximum Non-detect	0.0125
Mean of Detected Data	0.0588
Median of Detected Data	0.00372
Variance of Detected Data	0.0592
SD of Detected Data	0.243
CV of Detected Data	4.139
Skewness of Detected Data	4.577
Mean of Detected log data	-5.478
SD of Detected Log data	1.706

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	161
Number treated as Detected	5
Single DL Percent Detection	96.99%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00776
SD	0.0866
Standard Error of Mean	0.00689
95% KM (t) UCL	0.0192
95% KM (z) UCL	0.0191
95% KM (BCA) UCL	0.0276
95% KM (Percentile Bootstrap) UCL	0.0214
95% KM (Chebyshev) UCL	0.0378
97.5% KM (Chebyshev) UCL	**0.0508**
99% KM (Chebyshev) UCL	0.0763

Potential UCL to Use ________

4,4'-DDE

Total Number of Data	166
Number of Non-Detect Data	144
Number of Detected Data	**22**
Minimum Detected	4.28E-04
Maximum Detected	0.0693
Percent Non-Detects	**86.75%**
Minimum Non-detect	3.26E-04
Maximum Non-detect	0.0373
Mean of Detected Data	0.00905
Median of Detected Data	0.00197
Variance of Detected Data	3.69E-04
SD of Detected Data	0.0192

CV of Detected Data	2.121
Skewness of Detected Data	2.781
Mean of Detected log data	-6
SD of Detected Log data	1.459

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00158
SD	0.00743
Standard Error of Mean	5.91E-04
95% KM (t) UCL	0.00256
95% KM (z) UCL	0.00256
95% KM (BCA) UCL	0.00281
95% KM (Percentile Bootstrap) UCL	0.00259
95% KM (Chebyshev) UCL	0.00416
97.5% KM (Chebyshev) UCL	0.00527
99% KM (Chebyshev) UCL	0.00746

Potential UCL to Use

95% KM (BCA) UCL	**0.00281**

4,4'-DDT

Total Number of Data	166
Number of Non-Detect Data	98
Number of Detected Data	**68**
Minimum Detected	2.81E-04
Maximum Detected	0.113
Percent Non-Detects	**59.04%**
Minimum Non-detect	1.25E-04
Maximum Non-detect	0.0143

Mean of Detected Data	0.0087
Median of Detected Data	0.00275
Variance of Detected Data	2.75E-04
SD of Detected Data	0.0166
CV of Detected Data	1.905
Skewness of Detected Data	4.44
Mean of Detected log data	-5.829
SD of Detected Log data	1.491

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	154
Number treated as Detected	12
Single DL Percent Detection	92.77%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00375
SD	0.0113
Standard Error of Mean	8.85E-04
95% KM (t) UCL	0.00521
95% KM (z) UCL	0.0052
95% KM (BCA) UCL	0.00548
95% KM (Percentile Bootstrap) UCL	0.00529
95% KM (Chebyshev) UCL	0.0076
97.5% KM (Chebyshev) UCL	**0.00927**
99% KM (Chebyshev) UCL	0.0125

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Acenaphthene

Total Number of Data	166
Number of Non-Detect Data	131
Number of Detected Data	**35**
Minimum Detected	0.0113
Maximum Detected	1.69
Percent Non-Detects	**78.92%**
Minimum Non-detect	0.0087
Maximum Non-detect	0.189

Mean of Detected Data	0.161
Median of Detected Data	0.0787
Variance of Detected Data	0.0894
SD of Detected Data	0.299
CV of Detected Data	1.852
Skewness of Detected Data	4.309
Mean of Detected log data	-2.602
SD of Detected Log data	1.192

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	160
Number treated as Detected	6
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0433
SD	0.149
Standard Error of Mean	0.0117
95% KM (t) UCL	0.0627
95% KM (z) UCL	0.0626
95% KM (BCA) UCL	0.0676
95% KM (Percentile Bootstrap) UCL	0.0635
95% KM (Chebyshev) UCL	0.0944
97.5% KM (Chebyshev) UCL	**0.116**
99% KM (Chebyshev) UCL	0.16

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Acenaphthylene

Total Number of Data	166
Number of Non-Detect Data	129
Number of Detected Data	**37**
Minimum Detected	0.0172
Maximum Detected	1.2
Percent Non-Detects	**77.71%**
Minimum Non-detect	0.00986
Maximum Non-detect	0.128

Mean of Detected Data	0.156
Median of Detected Data	0.0517
Variance of Detected Data	0.084
SD of Detected Data	0.29
CV of Detected Data	1.862
Skewness of Detected Data	3.012
Mean of Detected log data	-2.69
SD of Detected Log data	1.124

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	156
Number treated as Detected	10
Single DL Percent Detection	93.98%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0484
SD	0.147
Standard Error of Mean	0.0116
95% KM (t) UCL	0.0675

95% KM (z) UCL	0.0674
95% KM (BCA) UCL	0.0719
95% KM (Percentile Bootstrap) UCL	0.0688
95% KM (Chebyshev) UCL	0.0987
97.5% KM (Chebyshev) UCL	0.12
99% KM (Chebyshev) UCL	0.163

Potential UCL to Use	
95% KM (BCA) UCL	**0.0719**

Acetone

Total Number of Data	83
Number of Non-Detect Data	73
Number of Detected Data	**10**
Minimum Detected	0.031
Maximum Detected	0.16
Percent Non-Detects	**87.95%**
Minimum Non-detect	1.71E-04
Maximum Non-detect	0.144

Mean of Detected Data	0.08
Median of Detected Data	0.0582
Variance of Detected Data	0.00277
SD of Detected Data	0.0526
CV of Detected Data	0.658
Skewness of Detected Data	0.756
Mean of Detected log data	-2.72
SD of Detected Log data	0.655

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.037
SD	0.0236
Standard Error of Mean	0.00274
95% KM (t) UCL	0.0415
95% KM (z) UCL	0.0415
95% KM (BCA) UCL	0.0559
95% KM (Percentile Bootstrap) UCL	0.0448
95% KM (Chebyshev) UCL	0.0489
97.5% KM (Chebyshev) UCL	**0.0541**
99% KM (Chebyshev) UCL	0.0642

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Aluminum

Number of Valid Observations	166
Number of Distinct Observations	149
Minimum	414
Maximum	15700
Mean	6452
Median	6175
SD	3601
Variance	12965507
Coefficient of Variation	0.558
Skewness	0.362
Mean of log data	8.565
SD of log data	0.718
95% Useful UCLs	
Student's-t UCL	6914
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	6920
95% Modified-t UCL	6916
Non-Parametric UCLs	
95% CLT UCL	6912
95% Jackknife UCL	6914
95% Standard Bootstrap UCL	6908
95% Bootstrap-t UCL	6929
95% Hall's Bootstrap UCL	6936
95% Percentile Bootstrap UCL	6914
95% BCA Bootstrap UCL	6917
95% Chebyshev(Mean, Sd) UCL	7670
97.5% Chebyshev(Mean, Sd) UCL	**8197**
99% Chebyshev(Mean, Sd) UCL	9233

Data appear Normal (0.05)

May want to try Normal UCLs

Anthracene

Total Number of Data	166
Number of Non-Detect Data	102
Number of Detected Data	**64**
Minimum Detected	0.0112
Maximum Detected	2.46
Percent Non-Detects	**61.45%**
Minimum Non-detect	0.00982
Maximum Non-detect	0.207
Mean of Detected Data	0.212
Median of Detected Data	0.0936
Variance of Detected Data	0.142

SD of Detected Data	0.377
CV of Detected Data	1.781
Skewness of Detected Data	4.103
Mean of Detected log data	-2.472
SD of Detected Log data	1.358

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	150
Number treated as Detected	16
Single DL Percent Detection	90.36%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0889
SD	0.252
Standard Error of Mean	0.0197
95% KM (t) UCL	0.122
95% KM (z) UCL	0.121
95% KM (BCA) UCL	0.124
95% KM (Percentile Bootstrap) UCL	0.122
95% KM (Chebyshev) UCL	0.175
97.5% KM (Chebyshev) UCL	0.212
99% KM (Chebyshev) UCL	0.285

Potential UCL to Use

95% KM (BCA) UCL	**0.124**

Antimony

Total Number of Data	166
Number of Non-Detect Data	101
Number of Detected Data	**65**
Minimum Detected	0.94
Maximum Detected	5.51
Percent Non-Detects	**60.84%**
Minimum Non-detect	0.19
Maximum Non-detect	1.04

Mean of Detected Data	2.249
Median of Detected Data	2.13
Variance of Detected Data	0.816
SD of Detected Data	0.903
CV of Detected Data	0.402
Skewness of Detected Data	1.372
Mean of Detected log data	0.739
SD of Detected Log data	0.379

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	103
Number treated as Detected	63
Single DL Percent Detection	62.05%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	1.452
SD	0.85
Standard Error of Mean	0.0665
95% KM (t) UCL	1.562
95% KM (z) UCL	1.562
95% KM (BCA) UCL	1.647
95% KM (Percentile Bootstrap) UCL	1.612
95% KM (Chebyshev) UCL	1.742
97.5% KM (Chebyshev) UCL	**1.868**
99% KM (Chebyshev) UCL	2.114

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Aroclor-1254

Total Number of Data	170
Number of Non-Detect Data	145
Number of Detected Data	**25**
Minimum Detected	0.0109
Maximum Detected	11.5
Percent Non-Detects	**85.29%**
Minimum Non-detect	0.00325
Maximum Non-detect	0.0391

Mean of Detected Data	1.407
Median of Detected Data	0.172
Variance of Detected Data	7.459
SD of Detected Data	2.731
CV of Detected Data	1.941
Skewness of Detected Data	2.874
Mean of Detected log data	-1.085
SD of Detected Log data	1.783

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	148
Number treated as Detected	22
Single DL Percent Detection	87.06%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.216
SD	1.139
Standard Error of Mean	0.0892
95% KM (t) UCL	0.364
95% KM (z) UCL	0.363
95% KM (BCA) UCL	0.427
95% KM (Percentile Bootstrap) UCL	0.376
95% KM (Chebyshev) UCL	0.605
97.5% KM (Chebyshev) UCL	**0.773**
99% KM (Chebyshev) UCL	1.104

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Arsenic

Total Number of Data	166
Number of Non-Detect Data	27
Number of Detected Data	**139**
Minimum Detected	0.23
Maximum Detected	24.3
Percent Non-Detects	**16.27%**
Minimum Non-detect	0.17
Maximum Non-detect	1.44

Mean of Detected Data	3.918
Median of Detected Data	3.09
Variance of Detected Data	10.64
SD of Detected Data	3.261
CV of Detected Data	0.832
Skewness of Detected Data	2.783
Mean of Detected log data	1.079
SD of Detected Log data	0.803

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	119
Single DL Percent Detection	28.31%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	28.31%
Mean	2.696
SD	1.062
95% Winsor (t) UCL	2.834

Kaplan Meier (KM) Method

Mean	3.331
SD	3.259
Standard Error of Mean	0.254
95% KM (t) UCL	3.752
95% KM (z) UCL	3.749
95% KM (BCA) UCL	3.777
95% KM (Percentile Bootstrap) UCL	3.77
95% KM (Chebyshev) UCL	4.438
97.5% KM (Chebyshev) UCL	**4.917**
99% KM (Chebyshev) UCL	5.858

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Barium

Number of Valid Observations	166
Number of Distinct Observations	135
Minimum	18.6
Maximum	2180
Mean	237.4
Median	139.5
SD	274.8
Variance	75535
Coefficient of Variation	1.158
Skewness	3.69
Mean of log data	5.104
SD of log data	0.789

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	272.7
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	279
95% Modified-t UCL	273.7
Non-Parametric UCLs	
95% CLT UCL	272.5
95% Jackknife UCL	272.7
95% Standard Bootstrap UCL	273.3
95% Bootstrap-t UCL	284
95% Hall's Bootstrap UCL	287.5
95% Percentile Bootstrap UCL	272.3
95% BCA Bootstrap UCL	279.3
95% Chebyshev(Mean, Sd) UCL	330.4
97.5% Chebyshev(Mean, Sd) UCL	370.6
99% Chebyshev(Mean, Sd) UCL	449.6
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**330.4**

Benzene

Total Number of Data	83
Number of Non-Detect Data	11
Number of Detected Data	**72**
Minimum Detected	3.39E-04
Maximum Detected	0.0221
Percent Non-Detects	**13.25%**
Minimum Non-detect	9.50E-05
Maximum Non-detect	0.0399
Mean of Detected Data	0.00425
Median of Detected Data	0.00378
Variance of Detected Data	1.01E-05
SD of Detected Data	0.00318
CV of Detected Data	0.748
Skewness of Detected Data	2.653
Mean of Detected log data	-5.736
SD of Detected Log data	0.821

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00389
SD	0.00315
Standard Error of Mean	3.52E-04
95% KM (t) UCL	0.00448
95% KM (z) UCL	0.00447
95% KM (BCA) UCL	0.00453
95% KM (Percentile Bootstrap) UCL	0.0045
95% KM (Chebyshev) UCL	0.00543
97.5% KM (Chebyshev) UCL	**0.00609**
99% KM (Chebyshev) UCL	0.0074

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Benzo(a)anthracene

Total Number of Data	166
Number of Non-Detect Data	122
Number of Detected Data	**44**
Minimum Detected	0.0118
Maximum Detected	5.02

Percent Non-Detects	**73.49%**
Minimum Non-detect	0.0089
Maximum Non-detect	0.193
Mean of Detected Data	0.98
Median of Detected Data	0.516
Variance of Detected Data	1.538
SD of Detected Data	1.24
CV of Detected Data	1.265
Skewness of Detected Data	1.955
Mean of Detected log data	-0.967
SD of Detected Log data	1.624

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	135
Number treated as Detected	31
Single DL Percent Detection	81.33%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.269
SD	0.762
Standard Error of Mean	0.0598
95% KM (t) UCL	0.368
95% KM (z) UCL	0.367
95% KM (BCA) UCL	0.39
95% KM (Percentile Bootstrap) UCL	0.378
95% KM (Chebyshev) UCL	0.53
97.5% KM (Chebyshev) UCL	**0.643**
99% KM (Chebyshev) UCL	0.864

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(a)pyrene

Total Number of Data	166
Number of Non-Detect Data	53
Number of Detected Data	**113**
Minimum Detected	0.00999
Maximum Detected	4.88
Percent Non-Detects	**31.93%**
Minimum Non-detect	0.00886
Maximum Non-detect	0.0984
Mean of Detected Data	0.506
Median of Detected Data	0.0666
Variance of Detected Data	0.998
SD of Detected Data	0.999

CV of Detected Data	1.973
Skewness of Detected Data	2.807
Mean of Detected log data	-2.255
SD of Detected Log data	1.801

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	115
Number treated as Detected	51
Single DL Percent Detection	69.28%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.348
SD	0.853
Standard Error of Mean	0.0665
95% KM (t) UCL	0.458
95% KM (z) UCL	0.457
95% KM (BCA) UCL	0.458
95% KM (Percentile Bootstrap) UCL	0.464
95% KM (Chebyshev) UCL	0.638
97.5% KM (Chebyshev) UCL	**0.763**
99% KM (Chebyshev) UCL	1.009

Potential UCL to Use ______

Benzo(b)fluoranthene

Total Number of Data	166
Number of Non-Detect Data	64
Number of Detected Data	**102**
Minimum Detected	0.0408
Maximum Detected	5.97
Percent Non-Detects	**38.55%**
Minimum Non-detect	0.00677
Maximum Non-detect	0.167

Mean of Detected Data	0.75
Median of Detected Data	0.206
Variance of Detected Data	1.497
SD of Detected Data	1.223
CV of Detected Data	1.63
Skewness of Detected Data	2.609
Mean of Detected log data	-1.254
SD of Detected Log data	1.353

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	109

Number treated as Detected	57
Single DL Percent Detection	65.66%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.477
SD	1.015
Standard Error of Mean	0.0791
95% KM (t) UCL	0.608
95% KM (z) UCL	0.608
95% KM (BCA) UCL	0.622
95% KM (Percentile Bootstrap) UCL	0.611
95% KM (Chebyshev) UCL	0.822
97.5% KM (Chebyshev) UCL	0.972
99% KM (Chebyshev) UCL	1.265

Potential UCL to Use	
95% KM (Chebyshev) UCL	**0.822**

Benzo(g,h,i)perylene

Total Number of Data	166
Number of Non-Detect Data	91
Number of Detected Data	**75**
Minimum Detected	0.00989
Maximum Detected	4.24
Percent Non-Detects	**54.82%**
Minimum Non-detect	0.00887
Maximum Non-detect	2.9

Mean of Detected Data	0.46
Median of Detected Data	0.105
Variance of Detected Data	0.603
SD of Detected Data	0.776
CV of Detected Data	1.688
Skewness of Detected Data	2.724
Mean of Detected log data	-1.908
SD of Detected Log data	1.53

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	165
Number treated as Detected	1
Single DL Percent Detection	99.40%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.217
SD	0.565
Standard Error of Mean	0.0443
95% KM (t) UCL	0.291
95% KM (z) UCL	0.29
95% KM (BCA) UCL	0.294
95% KM (Percentile Bootstrap) UCL	0.296
95% KM (Chebyshev) UCL	0.41
97.5% KM (Chebyshev) UCL	**0.494**
99% KM (Chebyshev) UCL	0.658

Potential UCL to Use ______

Benzo(k)fluoranthene

Total Number of Data	166
Number of Non-Detect Data	121
Number of Detected Data	**45**
Minimum Detected	0.0158
Maximum Detected	4.25
Percent Non-Detects	**72.89%**
Minimum Non-detect	0.0137
Maximum Non-detect	0.296
Mean of Detected Data	0.537
Median of Detected Data	0.228
Variance of Detected Data	0.578
SD of Detected Data	0.76
CV of Detected Data	1.415
Skewness of Detected Data	2.959
Mean of Detected log data	-1.534
SD of Detected Log data	1.472

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	149
Number treated as Detected	17
Single DL Percent Detection	89.76%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.158
SD	0.455
Standard Error of Mean	0.0357
95% KM (t) UCL	0.217
95% KM (z) UCL	0.216
95% KM (BCA) UCL	0.228
95% KM (Percentile Bootstrap) UCL	0.223
95% KM (Chebyshev) UCL	0.313

97.5% KM (Chebyshev) UCL	**0.381**
99% KM (Chebyshev) UCL	0.513

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Beryllium

Total Number of Data	166
Number of Non-Detect Data	1
Number of Detected Data	**165**
Minimum Detected	0.014
Maximum Detected	4.6
Percent Non-Detects	**0.60%**
Minimum Non-detect	0.0031
Maximum Non-detect	0.0031
Mean of Detected Data	0.468
Median of Detected Data	0.42
Variance of Detected Data	0.176
SD of Detected Data	0.419
CV of Detected Data	0.897
Skewness of Detected Data	5.967
Mean of Detected log data	-1.079
SD of Detected Log data	0.914

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	0.914
Mean	0.446
SD	0.281
95% Winsor (t) UCL	0.482
Kaplan Meier (KM) Method	
Mean	0.465
SD	0.418
Standard Error of Mean	0.0326
95% KM (t) UCL	0.519
95% KM (z) UCL	0.518
95% KM (BCA) UCL	0.525
95% KM (Percentile Bootstrap) UCL	0.521
95% KM (Chebyshev) UCL	0.607
97.5% KM (Chebyshev) UCL	0.668
99% KM (Chebyshev) UCL	0.789
Potential UCL to Use	
95% KM (BCA) UCL	**0.525**

Boron

Total Number of Data	166
Number of Non-Detect Data	95

Number of Detected Data	**71**
Minimum Detected	2.43
Maximum Detected	54.4
Percent Non-Detects	**57.23%**
Minimum Non-detect	0.95
Maximum Non-detect	15.3

Mean of Detected Data	9.924
Median of Detected Data	9.39
Variance of Detected Data	43.63
SD of Detected Data	6.605
CV of Detected Data	0.666
Skewness of Detected Data	4.557
Mean of Detected log data	2.158
SD of Detected Log data	0.518

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	5.675
SD	5.667
Standard Error of Mean	0.444
95% KM (t) UCL	6.41
95% KM (z) UCL	6.406
95% KM (BCA) UCL	6.674
95% KM (Percentile Bootstrap) UCL	6.505
95% KM (Chebyshev) UCL	7.611
97.5% KM (Chebyshev) UCL	8.449
99% KM (Chebyshev) UCL	10.09

Potential UCL to Use	
95% KM (t) UCL	6.41
95% KM (% Bootstrap) UCL	**6.505**

Butyl benzyl phthalate

Total Number of Data	166
Number of Non-Detect Data	156
Number of Detected Data	**10**
Minimum Detected	0.0129
Maximum Detected	0.617
Percent Non-Detects	**93.98%**
Minimum Non-detect	0.0109
Maximum Non-detect	0.237

Mean of Detected Data	0.13
Median of Detected Data	0.04
Variance of Detected Data	0.0374
SD of Detected Data	0.193
CV of Detected Data	1.489
Skewness of Detected Data	2.178
Mean of Detected log data	-2.847
SD of Detected Log data	1.268

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0201
SD	0.0529
Standard Error of Mean	0.00433
95% KM (t) UCL	0.0273
95% KM (z) UCL	0.0272
95% KM (BCA) UCL	0.0439
95% KM (Percentile Bootstrap) UCL	0.0353
95% KM (Chebyshev) UCL	0.039
97.5% KM (Chebyshev) UCL	**0.0472**
99% KM (Chebyshev) UCL	0.0632

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Cadmium

Total Number of Data	166
Number of Non-Detect Data	73
Number of Detected Data	**93**
Minimum Detected	0.023
Maximum Detected	9.71
Percent Non-Detects	**43.98%**
Minimum Non-detect	0.017
Maximum Non-detect	0.087

Mean of Detected Data	0.589
Median of Detected Data	0.33
Variance of Detected Data	1.174
SD of Detected Data	1.084
CV of Detected Data	1.838
Skewness of Detected Data	6.915
Mean of Detected log data	-1.032

SD of Detected Log data	0.913

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	86
Single DL Percent Detection	48.19%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	48.19%
Mean	0.126
SD	0.0338
95% Winsor (t) UCL	0.131

Kaplan Meier (KM) Method	
Mean	0.34
SD	0.854
Standard Error of Mean	0.0667
95% KM (t) UCL	0.451
95% KM (z) UCL	0.45
95% KM (BCA) UCL	0.505
95% KM (Percentile Bootstrap) UCL	0.467
95% KM (Chebyshev) UCL	0.631
97.5% KM (Chebyshev) UCL	0.757
99% KM (Chebyshev) UCL	1.004

Potential UCL to Use	
95% KM (t) UCL	**0.451**
95% KM (% Bootstrap) UCL	**0.467**

Carbazole

Total Number of Data	166
Number of Non-Detect Data	124
Number of Detected Data	**42**
Minimum Detected	0.0104
Maximum Detected	1.54
Percent Non-Detects	**74.70%**
Minimum Non-detect	0.00864
Maximum Non-detect	0.187

Mean of Detected Data	0.151
Median of Detected Data	0.0857
Variance of Detected Data	0.0723
SD of Detected Data	0.269
CV of Detected Data	1.777
Skewness of Detected Data	3.938
Mean of Detected log data	-2.746
SD of Detected Log data	1.291

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	158
Number treated as Detected	8
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0464
SD	0.147
Standard Error of Mean	0.0116
95% KM (t) UCL	0.0656
95% KM (z) UCL	0.0654
95% KM (BCA) UCL	0.0705
95% KM (Percentile Bootstrap) UCL	0.067
95% KM (Chebyshev) UCL	0.0968
97.5% KM (Chebyshev) UCL	**0.119**
99% KM (Chebyshev) UCL	0.161

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Carbon disulfide

Total Number of Data	83
Number of Non-Detect Data	70
Number of Detected Data	**13**
Minimum Detected	9.87E-04
Maximum Detected	0.028
Percent Non-Detects	**84.34%**
Minimum Non-detect	5.00E-05
Maximum Non-detect	0.0419

Mean of Detected Data	0.00521
Median of Detected Data	0.00299
Variance of Detected Data	5.05E-05
SD of Detected Data	0.00711
CV of Detected Data	1.364
Skewness of Detected Data	3.177
Mean of Detected log data	-5.705
SD of Detected Log data	0.881

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00167
SD	0.00313
Standard Error of Mean	3.60E-04
95% KM (t) UCL	0.00227
95% KM (z) UCL	0.00226
95% KM (BCA) UCL	0.00339
95% KM (Percentile Bootstrap) UCL	0.00269
95% KM (Chebyshev) UCL	0.00324
97.5% KM (Chebyshev) UCL	**0.00392**
99% KM (Chebyshev) UCL	0.00525

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Chromium

Number of Valid Observations	166
Number of Distinct Observations	144
Minimum	2.03
Maximum	136
Mean	13.53
Median	10.55
SD	12.49
Variance	156
Coefficient of Variation	0.923
Skewness	6.346
Mean of log data	2.41
SD of log data	0.582

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	15.13
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.63
95% Modified-t UCL	15.21
Non-Parametric UCLs	
95% CLT UCL	15.12
95% Jackknife UCL	15.13
95% Standard Bootstrap UCL	15.14
95% Bootstrap-t UCL	16.04
95% Hall's Bootstrap UCL	22.48
95% Percentile Bootstrap UCL	15.23
95% BCA Bootstrap UCL	15.68
95% Chebyshev(Mean, Sd) UCL	17.75
97.5% Chebyshev(Mean, Sd) UCL	19.58
99% Chebyshev(Mean, Sd) UCL	23.17

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	**17.75**

Chrysene

Total Number of Data	166
Number of Non-Detect Data	73
Number of Detected Data	**93**
Minimum Detected	0.00901
Maximum Detected	4.87
Percent Non-Detects	**43.98%**
Minimum Non-detect	0.00842
Maximum Non-detect	0.169
Mean of Detected Data	0.577
Median of Detected Data	0.139
Variance of Detected Data	0.978
SD of Detected Data	0.989
CV of Detected Data	1.714
Skewness of Detected Data	2.465
Mean of Detected log data	-1.859
SD of Detected Log data	1.688

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	125
Number treated as Detected	41
Single DL Percent Detection	75.30%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.328
SD	0.788
Standard Error of Mean	0.0615
95% KM (t) UCL	0.429
95% KM (z) UCL	0.429
95% KM (BCA) UCL	0.434
95% KM (Percentile Bootstrap) UCL	0.432
95% KM (Chebyshev) UCL	0.596
97.5% KM (Chebyshev) UCL	**0.712**
99% KM (Chebyshev) UCL	0.939

Potential UCL to Use ______

Cobalt

Total Number of Data	166
Number of Non-Detect Data	1
Number of Detected Data	**165**
Minimum Detected	0.049

Maximum Detected	16
Percent Non-Detects	**0.60%**
Minimum Non-detect	0.025
Maximum Non-detect	0.025

Mean of Detected Data	4.169
Median of Detected Data	3.99
Variance of Detected Data	4.113
SD of Detected Data	2.028
CV of Detected Data	0.486
Skewness of Detected Data	1.409
Mean of Detected log data	1.289
SD of Detected Log data	0.615

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.615
Mean	4.109
SD	1.885
95% Winsor (t) UCL	**4.351**

Kaplan Meier (KM) Method	
Mean	4.144
SD	2.041
Standard Error of Mean	0.159
95% KM (t) UCL	4.407
95% KM (z) UCL	4.406
95% KM (BCA) UCL	4.408
95% KM (Percentile Bootstrap) UCL	4.417
95% KM (Chebyshev) UCL	4.837
97.5% KM (Chebyshev) UCL	5.137
99% KM (Chebyshev) UCL	5.725

Data appear Normal (0.05)

May want to try Normal UCLs

Copper

Total Number of Data	166
Number of Non-Detect Data	2
Number of Detected Data	**164**
Minimum Detected	0.13
Maximum Detected	487
Percent Non-Detects	**1.20%**
Minimum Non-detect	0.066
Maximum Non-detect	0.3

Mean of Detected Data	24.55
Median of Detected Data	12
Variance of Detected Data	2206
SD of Detected Data	46.97
CV of Detected Data	1.913
Skewness of Detected Data	6.882

Mean of Detected log data	2.587
SD of Detected Log data	1.065

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	3
Number treated as Detected	163
Single DL Percent Detection	1.81%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	1.81%
Mean	21.1
SD	25.47
95% Winsor (t) UCL	24.37

Kaplan Meier (KM) Method	
Mean	24.26
SD	46.62
Standard Error of Mean	3.63
95% KM (t) UCL	30.26
95% KM (z) UCL	30.23
95% KM (BCA) UCL	31.03
95% KM (Percentile Bootstrap) UCL	30.9
95% KM (Chebyshev) UCL	40.08
97.5% KM (Chebyshev) UCL	46.92
99% KM (Chebyshev) UCL	60.37

Potential UCL to Use	
95% KM (Chebyshev) UCL	**40.08**

Cyclohexane

Total Number of Data	83
Number of Non-Detect Data	36
Number of Detected Data	**47**
Minimum Detected	6.26E-04
Maximum Detected	21.7
Percent Non-Detects	**43.37%**
Minimum Non-detect	8.87E-04
Maximum Non-detect	0.0685

Mean of Detected Data	0.467
Median of Detected Data	0.00177
Variance of Detected Data	10.01
SD of Detected Data	3.165
CV of Detected Data	6.783
Skewness of Detected Data	6.855
Mean of Detected log data	-5.92
SD of Detected Log data	1.616

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	81
Number treated as Detected	2
Single DL Percent Detection	97.59%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.265
SD	2.367
Standard Error of Mean	0.263
95% KM (t) UCL	0.702
95% KM (z) UCL	0.697
95% KM (BCA) UCL	0.787
95% KM (Percentile Bootstrap) UCL	0.787
95% KM (Chebyshev) UCL	1.409
97.5% KM (Chebyshev) UCL	**1.905**
99% KM (Chebyshev) UCL	2.878

Potential UCL to Use ______

Dibenz(a,h)anthracene

Total Number of Data	166
Number of Non-Detect Data	**110**
Number of Detected Data	56
Minimum Detected	0.0619
Maximum Detected	1.64
Percent Non-Detects	**66.27%**
Minimum Non-detect	0.00846
Maximum Non-detect	0.183

Mean of Detected Data	0.317
Median of Detected Data	0.145
Variance of Detected Data	0.127
SD of Detected Data	0.356
CV of Detected Data	1.122
Skewness of Detected Data	2.024
Mean of Detected log data	-1.608
SD of Detected Log data	0.914

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	143
Number treated as Detected	23
Single DL Percent Detection	86.14%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.148
SD	0.238
Standard Error of Mean	0.0186
95% KM (t) UCL	0.179
95% KM (z) UCL	0.179
95% KM (BCA) UCL	0.186
95% KM (Percentile Bootstrap) UCL	0.18
95% KM (Chebyshev) UCL	0.229
97.5% KM (Chebyshev) UCL	0.264
99% KM (Chebyshev) UCL	0.333

Potential UCL to Use	
95% KM (t) UCL	**0.179**
95% KM (% Bootstrap) UCL	**0.18**

Dibenzofuran

Total Number of Data	166
Number of Non-Detect Data	143
Number of Detected Data	**23**
Minimum Detected	0.0167
Maximum Detected	0.821
Percent Non-Detects	**86.14%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.268
Mean of Detected Data	0.133
Median of Detected Data	0.0604
Variance of Detected Data	0.0357
SD of Detected Data	0.189
CV of Detected Data	1.415
Skewness of Detected Data	2.831
Mean of Detected log data	-2.559
SD of Detected Log data	0.963

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	163
Number treated as Detected	3
Single DL Percent Detection	98.19%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0334
SD	0.0798
Standard Error of Mean	0.00635
95% KM (t) UCL	0.0439
95% KM (z) UCL	0.0439

95% KM (BCA) UCL	0.0541
95% KM (Percentile Bootstrap) UCL	0.05
95% KM (Chebyshev) UCL	0.0611
97.5% KM (Chebyshev) UCL	**0.0731**
99% KM (Chebyshev) UCL	0.0966

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Dieldrin

Total Number of Data	166
Number of Non-Detect Data	133
Number of Detected Data	**33**
Minimum Detected	2.43E-04
Maximum Detected	0.0205
Percent Non-Detects	**80.12%**
Minimum Non-detect	1.40E-04
Maximum Non-detect	0.0161
Mean of Detected Data	0.00344
Median of Detected Data	0.00172
Variance of Detected Data	2.32E-05
SD of Detected Data	0.00481
CV of Detected Data	1.398
Skewness of Detected Data	2.321
Mean of Detected log data	-6.408
SD of Detected Log data	1.218

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	8.89E-04
SD	0.00247
Standard Error of Mean	1.95E-04
95% KM (t) UCL	0.00121
95% KM (z) UCL	0.00121
95% KM (BCA) UCL	0.00137
95% KM (Percentile Bootstrap) UCL	0.00125
95% KM (Chebyshev) UCL	0.00174
97.5% KM (Chebyshev) UCL	**0.00211**
99% KM (Chebyshev) UCL	0.00283

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Di-n-butyl phthalate

Total Number of Data	166
Number of Non-Detect Data	155
Number of Detected Data	**11**
Minimum Detected	0.0311
Maximum Detected	0.753
Percent Non-Detects	**93.37%**
Minimum Non-detect	0.0251
Maximum Non-detect	0.542
Mean of Detected Data	0.188
Median of Detected Data	0.0819
Variance of Detected Data	0.0511
SD of Detected Data	0.226
CV of Detected Data	1.201
Skewness of Detected Data	1.85
Mean of Detected log data	-2.241
SD of Detected Log data	1.087

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	165
Number treated as Detected	1
Single DL Percent Detection	99.40%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0418
SD	0.068
Standard Error of Mean	0.00556
95% KM (t) UCL	0.051
95% KM (z) UCL	0.0509
95% KM (BCA) UCL	0.0679
95% KM (Percentile Bootstrap) UCL	0.0598
95% KM (Chebyshev) UCL	0.066
97.5% KM (Chebyshev) UCL	**0.0765**
99% KM (Chebyshev) UCL	0.097

Data follow Appr. Gamma Distribution (0.05)

May want to try Gamma UCLs

Endosulfan sulfate

Total Number of Data	166

Number of Non-Detect Data	145
Number of Detected Data	**21**
Minimum Detected	4.22E-04
Maximum Detected	0.0713
Percent Non-Detects	**87.35%**
Minimum Non-detect	2.65E-04
Maximum Non-detect	0.0304
Mean of Detected Data	0.00705
Median of Detected Data	0.00154
Variance of Detected Data	2.55E-04
SD of Detected Data	0.016
CV of Detected Data	2.263
Skewness of Detected Data	3.667
Mean of Detected log data	-6.164
SD of Detected Log data	1.391

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	165
Number treated as Detected	1
Single DL Percent Detection	99.40%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00127
SD	0.00597
Standard Error of Mean	4.75E-04
95% KM (t) UCL	0.00206
95% KM (z) UCL	0.00205
95% KM (BCA) UCL	0.0023
95% KM (Percentile Bootstrap) UCL	0.00215
95% KM (Chebyshev) UCL	0.00334
97.5% KM (Chebyshev) UCL	0.00424
99% KM (Chebyshev) UCL	0.006
Potential UCL to Use	
95% KM (BCA) UCL	**0.0023**

Endrin aldehyde

Total Number of Data	166
Number of Non-Detect Data	135
Number of Detected Data	**31**
Minimum Detected	4.97E-04
Maximum Detected	0.0738
Percent Non-Detects	**81.33%**
Minimum Non-detect	3.36E-04
Maximum Non-detect	0.0385

Mean of Detected Data	0.00852
Median of Detected Data	0.00247
Variance of Detected Data	2.29E-04
SD of Detected Data	0.0151
CV of Detected Data	1.779
Skewness of Detected Data	3.24
Mean of Detected log data	-5.658
SD of Detected Log data	1.245

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	164
Number treated as Detected	2
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00201
SD	0.00716
Standard Error of Mean	5.66E-04
95% KM (t) UCL	0.00295
95% KM (z) UCL	0.00294
95% KM (BCA) UCL	0.00354
95% KM (Percentile Bootstrap) UCL	0.0032
95% KM (Chebyshev) UCL	0.00448
97.5% KM (Chebyshev) UCL	0.00554
99% KM (Chebyshev) UCL	0.00764

Potential UCL to Use

95% KM (BCA) UCL	**0.00354**

Endrin ketone

Total Number of Data	166
Number of Non-Detect Data	142
Number of Detected Data	**24**
Minimum Detected	7.03E-04
Maximum Detected	0.02
Percent Non-Detects	**85.54%**
Minimum Non-detect	4.26E-04
Maximum Non-detect	0.0482

Mean of Detected Data	0.00502
Median of Detected Data	0.00291
Variance of Detected Data	2.23E-05
SD of Detected Data	0.00473
CV of Detected Data	0.942
Skewness of Detected Data	1.696
Mean of Detected log data	-5.673
SD of Detected Log data	0.886

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	166
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00135
SD	0.00235
Standard Error of Mean	1.88E-04
95% KM (t) UCL	0.00166
95% KM (z) UCL	0.00166
95% KM (BCA) UCL	0.00212
95% KM (Percentile Bootstrap) UCL	0.00201
95% KM (Chebyshev) UCL	0.00217
97.5% KM (Chebyshev) UCL	**0.00253**
99% KM (Chebyshev) UCL	0.00322

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Ethylbenzene

Total Number of Data	83
Number of Non-Detect Data	36
Number of Detected Data	**47**
Minimum Detected	6.54E-04
Maximum Detected	0.105
Percent Non-Detects	**43.37%**
Minimum Non-detect	1.54E-04
Maximum Non-detect	0.0795

Mean of Detected Data	0.00536
Median of Detected Data	0.00206
Variance of Detected Data	2.57E-04
SD of Detected Data	0.016
CV of Detected Data	2.992
Skewness of Detected Data	5.73
Mean of Detected log data	-6.04
SD of Detected Log data	0.853

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	82
Number treated as Detected	1
Single DL Percent Detection	98.80%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0034
SD	0.0122
Standard Error of Mean	0.00135
95% KM (t) UCL	0.00564
95% KM (z) UCL	0.00562
95% KM (BCA) UCL	0.00624
95% KM (Percentile Bootstrap) UCL	0.00591
95% KM (Chebyshev) UCL	0.00929
97.5% KM (Chebyshev) UCL	0.0118
99% KM (Chebyshev) UCL	0.0168

Potential UCL to Use	
95% KM (t) UCL	**0.00564**
95% KM (% Bootstrap) UCL	**0.00591**

Fluoranthene

Total Number of Data	166
Number of Non-Detect Data	70
Number of Detected Data	**96**
Minimum Detected	0.0133
Maximum Detected	14.2
Percent Non-Detects	**42.17%**
Minimum Non-detect	0.0107
Maximum Non-detect	0.213

Mean of Detected Data	1.017
Median of Detected Data	0.179
Variance of Detected Data	4.437
SD of Detected Data	2.106
CV of Detected Data	2.071
Skewness of Detected Data	3.808
Mean of Detected log data	-1.503
SD of Detected Log data	1.799

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	119
Number treated as Detected	47
Single DL Percent Detection	71.69%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.595
SD	1.669
Standard Error of Mean	0.13
95% KM (t) UCL	0.81
95% KM (z) UCL	0.809
95% KM (BCA) UCL	0.825
95% KM (Percentile Bootstrap) UCL	0.819
95% KM (Chebyshev) UCL	1.162
97.5% KM (Chebyshev) UCL	**1.408**
99% KM (Chebyshev) UCL	1.89

Potential UCL to Use ______

Fluorene

Total Number of Data	166
Number of Non-Detect Data	125
Number of Detected Data	**41**
Minimum Detected	0.00945
Maximum Detected	1.11
Percent Non-Detects	**75.30%**
Minimum Non-detect	0.0086
Maximum Non-detect	0.186

Mean of Detected Data	0.149
Median of Detected Data	0.0805
Variance of Detected Data	0.053
SD of Detected Data	0.23
CV of Detected Data	1.543
Skewness of Detected Data	2.813
Mean of Detected log data	-2.681
SD of Detected Log data	1.232

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	158
Number treated as Detected	8
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0444
SD	0.128
Standard Error of Mean	0.0101
95% KM (t) UCL	0.0611
95% KM (z) UCL	0.061
95% KM (BCA) UCL	0.0666
95% KM (Percentile Bootstrap) UCL	0.0624
95% KM (Chebyshev) UCL	0.0883
97.5% KM (Chebyshev) UCL	**0.107**

99% KM (Chebyshev) UCL	0.145

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

gamma-Chlordane

Total Number of Data	166
Number of Non-Detect Data	154
Number of Detected Data	**12**
Minimum Detected	7.10E-04
Maximum Detected	0.0156
Percent Non-Detects	**92.77%**
Minimum Non-detect	2.20E-04
Maximum Non-detect	0.0253
Mean of Detected Data	0.00463
Median of Detected Data	0.00344
Variance of Detected Data	2.56E-05
SD of Detected Data	0.00506
CV of Detected Data	1.093
Skewness of Detected Data	1.624
Mean of Detected log data	-5.882
SD of Detected Log data	1.058

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	166
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	9.98E-04
SD	0.00166
Standard Error of Mean	1.35E-04
95% KM (t) UCL	0.00122
95% KM (z) UCL	0.00122
95% KM (BCA) UCL	0.00173
95% KM (Percentile Bootstrap) UCL	0.00144
95% KM (Chebyshev) UCL	0.00159
97.5% KM (Chebyshev) UCL	**0.00184**
99% KM (Chebyshev) UCL	0.00234

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Indeno(1,2,3-cd)pyrene

Total Number of Data	166
Number of Non-Detect Data	62
Number of Detected Data	**104**
Minimum Detected	0.0574
Maximum Detected	6.49
Percent Non-Detects	**37.35%**
Minimum Non-detect	0.0142
Maximum Non-detect	0.158
Mean of Detected Data	0.58
Median of Detected Data	0.145
Variance of Detected Data	0.934
SD of Detected Data	0.967
CV of Detected Data	1.665
Skewness of Detected Data	3.417
Mean of Detected log data	-1.406
SD of Detected Log data	1.225

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	115
Number treated as Detected	51
Single DL Percent Detection	69.28%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.385
SD	0.802
Standard Error of Mean	0.0626
95% KM (t) UCL	0.489
95% KM (z) UCL	0.488
95% KM (BCA) UCL	0.495
95% KM (Percentile Bootstrap) UCL	0.495
95% KM (Chebyshev) UCL	0.658
97.5% KM (Chebyshev) UCL	0.776
99% KM (Chebyshev) UCL	1.008

Potential UCL to Use
95% KM (Chebyshev) UCL **0.658**

Iron

Number of Valid Observations	166
Number of Distinct Observations	125
Minimum	2410
Maximum	77100
Mean	14277
Median	12400

SD	9389
Variance	88155411
Coefficient of Variation	0.658
Skewness	3.268
Mean of log data	9.418
SD of log data	0.533

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	15482
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15673
95% Modified-t UCL	15513
Non-Parametric UCLs	
95% CLT UCL	15475
95% Jackknife UCL	15482
95% Standard Bootstrap UCL	15450
95% Bootstrap-t UCL	15739
95% Hall's Bootstrap UCL	15921
95% Percentile Bootstrap UCL	15429
95% BCA Bootstrap UCL	15603
95% Chebyshev(Mean, Sd) UCL	17453
97.5% Chebyshev(Mean, Sd) UCL	18828
99% Chebyshev(Mean, Sd) UCL	21528
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**17453**

Isopropylbenzene (Cumene)

Total Number of Data	83
Number of Non-Detect Data	67
Number of Detected Data	**16**
Minimum Detected	3.18E-04
Maximum Detected	64.9
Percent Non-Detects	**80.72%**
Minimum Non-detect	7.00E-05
Maximum Non-detect	0.00948
Mean of Detected Data	4.309
Median of Detected Data	0.00233
Variance of Detected Data	262
SD of Detected Data	16.18
CV of Detected Data	3.756
Skewness of Detected Data	3.978
Mean of Detected log data	-4.744
SD of Detected Log data	3.489

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs
Number treated as Non-Detect 77

Number treated as Detected	6
Single DL Percent Detection	92.77%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.831
SD	7.087
Standard Error of Mean	0.803
95% KM (t) UCL	2.167
95% KM (z) UCL	2.152
95% KM (BCA) UCL	2.394
95% KM (Percentile Bootstrap) UCL	2.394
95% KM (Chebyshev) UCL	4.333
97.5% KM (Chebyshev) UCL	5.848
99% KM (Chebyshev) UCL	8.825

Potential UCL to Use	
97.5% KM (Chebyshev) UCL	**5.848**

Lead

Number of Valid Observations	166
Number of Distinct Observations	145
Minimum	2.48
Maximum	702
Mean	53.52
Median	17.1
SD	104.2
Variance	10860
Coefficient of Variation	1.947
Skewness	4.276
Mean of log data	3.186
SD of log data	1.12

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	66.9
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	69.69
95% Modified-t UCL	67.35
Non-Parametric UCLs	
95% CLT UCL	66.82
95% Jackknife UCL	66.9
95% Standard Bootstrap UCL	66.77
95% Bootstrap-t UCL	70.85
95% Hall's Bootstrap UCL	69.86
95% Percentile Bootstrap UCL	67.01
95% BCA Bootstrap UCL	68.96

95% Chebyshev(Mean, Sd) UCL	88.78
97.5% Chebyshev(Mean, Sd) UCL	104
99% Chebyshev(Mean, Sd) UCL	134

Potential UCL to Use
Use 97.5% Chebyshev (Mean, Sd) UCL **104**

Lithium

Number of Valid Observations	166
Number of Distinct Observations	145
Minimum	0.65
Maximum	28.6
Mean	10.03
Median	9.02
SD	6.299
Variance	39.67
Coefficient of Variation	0.628
Skewness	0.63
Mean of log data	2.054
SD of log data	0.791

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	10.84
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	10.86
95% Modified-t UCL	10.85
Non-Parametric UCLs	
95% CLT UCL	10.84
95% Jackknife UCL	10.84
95% Standard Bootstrap UCL	10.85
95% Bootstrap-t UCL	10.85
95% Hall's Bootstrap UCL	10.89
95% Percentile Bootstrap UCL	10.84
95% BCA Bootstrap UCL	10.86
95% Chebyshev(Mean, Sd) UCL	12.17
97.5% Chebyshev(Mean, Sd) UCL	13.09
99% Chebyshev(Mean, Sd) UCL	14.9

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **12.17**

m,p-Xylene

Total Number of Data	83
Number of Non-Detect Data	30
Number of Detected Data	**53**
Minimum Detected	5.58E-04
Maximum Detected	2.56
Percent Non-Detects	**36.14%**

Minimum Non-detect	1.82E-04
Maximum Non-detect	0.0247
Mean of Detected Data	0.0533
Median of Detected Data	0.00141
Variance of Detected Data	0.123
SD of Detected Data	0.351
CV of Detected Data	6.594
Skewness of Detected Data	7.251
Mean of Detected log data	-6.235
SD of Detected Log data	1.391

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0343
SD	0.279
Standard Error of Mean	0.031
95% KM (t) UCL	0.0858
95% KM (z) UCL	0.0852
95% KM (BCA) UCL	0.0945
95% KM (Percentile Bootstrap) UCL	0.0955
95% KM (Chebyshev) UCL	0.169
97.5% KM (Chebyshev) UCL	0.228
99% KM (Chebyshev) UCL	0.342

Potential UCL to Use
95% KM (Chebyshev) UCL **0.169**

Manganese

Number of Valid Observations	166
Number of Distinct Observations	133
Minimum	59.3
Maximum	892
Mean	261.2
Median	224.5
SD	127.4
Variance	16239
Coefficient of Variation	0.488
Skewness	2.072
Mean of log data	5.47
SD of log data	0.429

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	277.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	279.2
95% Modified-t UCL	277.8
Non-Parametric UCLs	
95% CLT UCL	277.5
95% Jackknife UCL	277.5
95% Standard Bootstrap UCL	277.4
95% Bootstrap-t UCL	279.2
95% Hall's Bootstrap UCL	280.3
95% Percentile Bootstrap UCL	277.8
95% BCA Bootstrap UCL	279.9
95% Chebyshev(Mean, Sd) UCL	304.3
97.5% Chebyshev(Mean, Sd) UCL	323
99% Chebyshev(Mean, Sd) UCL	359.6
Potential UCL to Use	
Use 95% Student's-t UCL	**277.5**
Or 95% Modified-t UCL	**277.8**

Mercury

Total Number of Data	166
Number of Non-Detect Data	93
Number of Detected Data	**73**
Minimum Detected	0.0026
Maximum Detected	0.85
Percent Non-Detects	**56.02%**
Minimum Non-detect	0.002
Maximum Non-detect	0.048
Mean of Detected Data	0.0533
Median of Detected Data	0.012
Variance of Detected Data	0.0189
SD of Detected Data	0.138
CV of Detected Data	2.582
Skewness of Detected Data	4.518
Mean of Detected log data	-4.069
SD of Detected Log data	1.269

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	154
Number treated as Detected	12
Single DL Percent Detection	92.77%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0256
Standard Error of Mean	0.00734
95% KM (t) UCL	0.0377
95% KM (z) UCL	0.0376
95% KM (BCA) UCL	0.04
95% KM (Percentile Bootstrap) UCL	0.0388
95% KM (Chebyshev) UCL	0.0576
97.5% KM (Chebyshev) UCL	0.0714
99% KM (Chebyshev) UCL	0.0986
Potential UCL to Use	
95% KM (BCA) UCL	**0.04**

Methylcyclohexane

Total Number of Data	83
Number of Non-Detect Data	26
Number of Detected Data	**57**
Minimum Detected	6.65E-04
Maximum Detected	2.73
Percent Non-Detects	**31.33%**
Minimum Non-detect	2.75E-04
Maximum Non-detect	0.0229
Mean of Detected Data	0.0528
Median of Detected Data	0.00224
Variance of Detected Data	0.13
SD of Detected Data	0.361
CV of Detected Data	6.838
Skewness of Detected Data	7.532
Mean of Detected log data	-5.932
SD of Detected Log data	1.234

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0366
SD	0.298
Standard Error of Mean	0.033
95% KM (t) UCL	0.0914
95% KM (z) UCL	0.0908
95% KM (BCA) UCL	0.102
95% KM (Percentile Bootstrap) UCL	0.102

95% KM (Chebyshev) UCL	0.18
97.5% KM (Chebyshev) UCL	0.242
99% KM (Chebyshev) UCL	0.365

Potential UCL to Use
95% KM (Chebyshev) UCL **0.18**

Molybdenum

Total Number of Data	166
Number of Non-Detect Data	48
Number of Detected Data	**118**
Minimum Detected	0.088
Maximum Detected	10.4
Percent Non-Detects	**28.92%**
Minimum Non-detect	0.068
Maximum Non-detect	0.33
Mean of Detected Data	1.236
Median of Detected Data	0.615
Variance of Detected Data	2.704
SD of Detected Data	1.644
CV of Detected Data	1.33
Skewness of Detected Data	2.955
Mean of Detected log data	-0.402
SD of Detected Log data	1.095

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	84
Number treated as Detected	82
Single DL Percent Detection	50.60%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.905
SD	1.475
Standard Error of Mean	0.115
95% KM (t) UCL	1.095
95% KM (z) UCL	1.094
95% KM (BCA) UCL	1.099
95% KM (Percentile Bootstrap) UCL	1.101
95% KM (Chebyshev) UCL	1.406
97.5% KM (Chebyshev) UCL	**1.623**
99% KM (Chebyshev) UCL	2.049

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

Naphthalene

Total Number of Data	83
Number of Non-Detect Data	76
Number of Detected Data	**7**
Minimum Detected	0.00482
Maximum Detected	19.2
Percent Non-Detects	**91.57%**
Minimum Non-detect	2.72E-04
Maximum Non-detect	0.0233
Mean of Detected Data	3.817
Median of Detected Data	0.0762
Variance of Detected Data	53.3
SD of Detected Data	7.301
CV of Detected Data	1.913
Skewness of Detected Data	2.047
Mean of Detected log data	-2.014
SD of Detected Log data	3.291

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.326
SD	2.231
Standard Error of Mean	0.264
95% KM (t) UCL	0.766
95% KM (z) UCL	0.761
95% KM (BCA) UCL	0.888
95% KM (Percentile Bootstrap) UCL	0.792
95% KM (Chebyshev) UCL	1.479
97.5% KM (Chebyshev) UCL	1.978
99% KM (Chebyshev) UCL	2.958

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median =** | **<0.00265**
[per recommendation in ProUCL User Guide]

Nickel

Number of Valid Observations	166
Number of Distinct Observations	120
Minimum	2.7
Maximum	36.7
Mean	11.74
Median	11.65
SD	4.874
Variance	23.76
Coefficient of Variation	0.415
Skewness	1.176
Mean of log data	2.374
SD of log data	0.441

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	12.37
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12.4
95% Modified-t UCL	12.37
Non-Parametric UCLs	
95% CLT UCL	12.36
95% Jackknife UCL	12.37
95% Standard Bootstrap UCL	12.38
95% Bootstrap-t UCL	12.43
95% Hall's Bootstrap UCL	12.45
95% Percentile Bootstrap UCL	12.39
95% BCA Bootstrap UCL	12.35
95% Chebyshev(Mean, Sd) UCL	13.39
97.5% Chebyshev(Mean, Sd) UCL	14.1
99% Chebyshev(Mean, Sd) UCL	15.5

Potential UCL to Use	
Use 95% Student's-t UCL	**12.37**
Or 95% Modified-t UCL	**12.37**

n-Propylbenzene

Total Number of Data	83
Number of Non-Detect Data	69
Number of Detected Data	**14**
Minimum Detected	2.30E-04
Maximum Detected	1.8
Percent Non-Detects	**83.13%**
Minimum Non-detect	6.40E-05
Maximum Non-detect	0.00868

Mean of Detected Data	0.139
Median of Detected Data	4.49E-04
Variance of Detected Data	0.229
SD of Detected Data	0.479
CV of Detected Data	3.441
Skewness of Detected Data	3.718
Mean of Detected log data	-6.488
SD of Detected Log data	2.756

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	80
Number treated as Detected	3
Single DL Percent Detection	96.39%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0237
SD	0.197
Standard Error of Mean	0.0224
95% KM (t) UCL	0.0609
95% KM (z) UCL	0.0605
95% KM (BCA) UCL	0.0684
95% KM (Percentile Bootstrap) UCL	0.0671
95% KM (Chebyshev) UCL	0.121
97.5% KM (Chebyshev) UCL	0.163
99% KM (Chebyshev) UCL	0.246

Potential UCL to Use
97.5% KM (Chebyshev) UCL **0.163**

o-Xylene

Total Number of Data	83
Number of Non-Detect Data	51
Number of Detected Data	**32**
Minimum Detected	2.23E-04
Maximum Detected	0.84
Percent Non-Detects	**61.45%**
Minimum Non-detect	8.00E-05
Maximum Non-detect	0.0108

Mean of Detected Data	0.0334
Median of Detected Data	6.15E-04
Variance of Detected Data	0.0222
SD of Detected Data	0.149
CV of Detected Data	4.456
Skewness of Detected Data	5.45
Mean of Detected log data	-6.683
SD of Detected Log data	1.929

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.013
SD	0.0925
Standard Error of Mean	0.0103
95% KM (t) UCL	0.0302
95% KM (z) UCL	0.03
95% KM (BCA) UCL	0.0338
95% KM (Percentile Bootstrap) UCL	0.0322
95% KM (Chebyshev) UCL	0.058
97.5% KM (Chebyshev) UCL	**0.0775**
99% KM (Chebyshev) UCL	0.116

Potential UCL to Use ______

Phenanthrene

Total Number of Data	166
Number of Non-Detect Data	71
Number of Detected Data	**95**
Minimum Detected	0.0138
Maximum Detected	12.6
Percent Non-Detects	**42.77%**
Minimum Non-detect	0.0115
Maximum Non-detect	0.235

Mean of Detected Data	0.691
Median of Detected Data	0.142
Variance of Detected Data	2.449
SD of Detected Data	1.565
CV of Detected Data	2.264
Skewness of Detected Data	5.422
Mean of Detected log data	-1.663
SD of Detected Log data	1.597

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	129
Number treated as Detected	37
Single DL Percent Detection	77.71%

Data Dsitribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.402
SD	1.224
Standard Error of Mean	0.0955
95% KM (t) UCL	0.56
95% KM (z) UCL	0.559
95% KM (BCA) UCL	0.593
95% KM (Percentile Bootstrap) UCL	0.572
95% KM (Chebyshev) UCL	0.819
97.5% KM (Chebyshev) UCL	**0.999**
99% KM (Chebyshev) UCL	1.353

Potential UCL to Use ______

Pyrene

Total Number of Data	166
Number of Non-Detect Data	68
Number of Detected Data	**98**
Minimum Detected	0.0121
Maximum Detected	8.47
Percent Non-Detects	**40.96%**
Minimum Non-detect	0.0111
Maximum Non-detect	0.3
Mean of Detected Data	0.721
Median of Detected Data	0.164
Variance of Detected Data	1.891
SD of Detected Data	1.375
CV of Detected Data	1.908
Skewness of Detected Data	3.327
Mean of Detected log data	-1.67
SD of Detected Log data	1.681

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	131
Number treated as Detected	35
Single DL Percent Detection	78.92%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.432
SD	1.107
Standard Error of Mean	0.0864
95% KM (t) UCL	0.575

95% KM (z) UCL	0.574
95% KM (BCA) UCL	0.58
95% KM (Percentile Bootstrap) UCL	0.572
95% KM (Chebyshev) UCL	0.808
97.5% KM (Chebyshev) UCL	**0.971**
99% KM (Chebyshev) UCL	1.291

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Strontium

Number of Valid Observations	166
Number of Distinct Observations	151
Minimum	16.5
Maximum	591
Mean	75.61
Median	58.1
SD	73.75
Variance	5439
Coefficient of Variation	0.975
Skewness	4.41
Mean of log data	4.107
SD of log data	0.59

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	85.08
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	87.12
95% Modified-t UCL	85.41
Non-Parametric UCLs	
95% CLT UCL	85.03
95% Jackknife UCL	85.08
95% Standard Bootstrap UCL	85.02
95% Bootstrap-t UCL	87.86
95% Hall's Bootstrap UCL	88.32
95% Percentile Bootstrap UCL	85.49
95% BCA Bootstrap UCL	86.55
95% Chebyshev(Mean, Sd) UCL	100.6
97.5% Chebyshev(Mean, Sd) UCL	111.4
99% Chebyshev(Mean, Sd) UCL	132.6
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**100.6**

Tin

Total Number of Data	166
Number of Non-Detect Data	134
Number of Detected Data	**32**

Minimum Detected	0.55
Maximum Detected	6.48
Percent Non-Detects	**80.72%**
Minimum Non-detect	0.46
Maximum Non-detect	2.4
Mean of Detected Data	1.896
Median of Detected Data	1.695
Variance of Detected Data	1.825
SD of Detected Data	1.351
CV of Detected Data	0.713
Skewness of Detected Data	1.594
Mean of Detected log data	0.413
SD of Detected Log data	0.692

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	156
Number treated as Detected	10
Single DL Percent Detection	93.98%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.811
SD	0.789
Standard Error of Mean	0.0623
95% KM (t) UCL	0.914
95% KM (z) UCL	0.914
95% KM (BCA) UCL	0.929
95% KM (Percentile Bootstrap) UCL	0.924
95% KM (Chebyshev) UCL	1.083
97.5% KM (Chebyshev) UCL	**1.2**
99% KM (Chebyshev) UCL	1.431

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Titanium

Number of Valid Observations	166
Number of Distinct Observations	114
Minimum	4.02
Maximum	645
Mean	25.77
Median	19
SD	50.15
Variance	2515
Coefficient of Variation	1.946
Skewness	11.61

Mean of log data	3.014
SD of log data	0.484

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	32.21
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	35.92
95% Modified-t UCL	32.8
Non-Parametric UCLs	
95% CLT UCL	32.17
95% Jackknife UCL	32.21
95% Standard Bootstrap UCL	32.16
95% Bootstrap-t UCL	49.28
95% Hall's Bootstrap UCL	55.9
95% Percentile Bootstrap UCL	33.18
95% BCA Bootstrap UCL	38.2
95% Chebyshev(Mean, Sd) UCL	42.74
97.5% Chebyshev(Mean, Sd) UCL	50.08
99% Chebyshev(Mean, Sd) UCL	64.5

Potential UCL to Use	
Use 95% Student's-t UCL	**32.21**
Or 95% Modified-t UCL	**32.8**

Toluene

Total Number of Data	83
Number of Non-Detect Data	14
Number of Detected Data	**69**
Minimum Detected	7.21E-04
Maximum Detected	0.0192
Percent Non-Detects	**16.87%**
Minimum Non-detect	5.22E-04
Maximum Non-detect	0.211
Mean of Detected Data	0.00437
Median of Detected Data	0.00382
Variance of Detected Data	7.80E-06
SD of Detected Data	0.00279
CV of Detected Data	0.639
Skewness of Detected Data	2.436
Mean of Detected log data	-5.612
SD of Detected Log data	0.626

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	83
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00399
SD	0.00285
Standard Error of Mean	3.27E-04
95% KM (t) UCL	0.00454
95% KM (z) UCL	0.00453
95% KM (BCA) UCL	0.00463
95% KM (Percentile Bootstrap) UCL	0.00453
95% KM (Chebyshev) UCL	0.00542
97.5% KM (Chebyshev) UCL	**0.00604**
99% KM (Chebyshev) UCL	0.00725

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Vanadium

Number of Valid Observations	166
Number of Distinct Observations	117
Minimum	4.73
Maximum	45.6
Mean	14.4
Median	13.75
SD	5.905
Variance	34.87
Coefficient of Variation	0.41
Skewness	1.359
Mean of log data	2.588
SD of log data	0.406
95% Useful UCLs	
Student's-t UCL	15.16
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.21
95% Modified-t UCL	15.17
Non-Parametric UCLs	
95% CLT UCL	15.16
95% Jackknife UCL	15.16
95% Standard Bootstrap UCL	15.16
95% Bootstrap-t UCL	15.23
95% Hall's Bootstrap UCL	15.21
95% Percentile Bootstrap UCL	15.15
95% BCA Bootstrap UCL	15.21
95% Chebyshev(Mean, Sd) UCL	16.4
97.5% Chebyshev(Mean, Sd) UCL	**17.27**
99% Chebyshev(Mean, Sd) UCL	18.96

Data appear Gamma Distributed (0.05)

May want to try Gamma UCLs

Xylene (total)

Total Number of Data	83
Number of Non-Detect Data	30
Number of Detected Data	**53**
Minimum Detected	7.77E-04
Maximum Detected	3.4
Percent Non-Detects	**36.14%**
Minimum Non-detect	2.61E-04
Maximum Non-detect	0.0355
Mean of Detected Data	0.0735
Median of Detected Data	0.00187
Variance of Detected Data	0.218
SD of Detected Data	0.467
CV of Detected Data	6.356
Skewness of Detected Data	7.213
Mean of Detected log data	-5.976
SD of Detected Log data	1.506

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	79
Number treated as Detected	4
Single DL Percent Detection	95.18%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0473
SD	0.371
Standard Error of Mean	0.0412
95% KM (t) UCL	0.116
95% KM (z) UCL	0.115
95% KM (BCA) UCL	0.129
95% KM (Percentile Bootstrap) UCL	0.129
95% KM (Chebyshev) UCL	0.227
97.5% KM (Chebyshev) UCL	**0.304**
99% KM (Chebyshev) UCL	0.457

Potential UCL to Use ______

Zinc

Number of Valid Observations	166
Number of Distinct Observations	159

Minimum	6.17
Maximum	7650
Mean	433.8
Median	192.5
SD	786.8
Variance	619126
Coefficient of Variation	1.814
Skewness	5.977
Mean of log data	5.141
SD of log data	1.438

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	534.8
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	564.5
95% Modified-t UCL	539.6
Non-Parametric UCLs	
95% CLT UCL	534.3
95% Jackknife UCL	534.8
95% Standard Bootstrap UCL	534.4
95% Bootstrap-t UCL	604.2
95% Hall's Bootstrap UCL	971.8
95% Percentile Bootstrap UCL	543.4
95% BCA Bootstrap UCL	581.3
95% Chebyshev(Mean, Sd) UCL	700
97.5% Chebyshev(Mean, Sd) UCL	815.2
99% Chebyshev(Mean, Sd) UCL	1041

Potential UCL to Use
Use 97.5% Chebyshev (Mean, Sd) UCL **815.2**

APPENDIX A-3

NORTH OF MARLIN SURFACE SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\Users\Michael\ . . . . \North of Marlin Soil Boring\N of Marlin Soil - surface\North of Marlin Soil - surface_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,1-Dichloroethane

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (nondetect) = <0.00671

1,1-Dichloroethene

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (nondetect) = <0.015

1,2-Dichloroethane

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (detect) = 0.177

2-Butanone

Total Number of Data 1

Insufficent Number of Observations to produce Meaningful Statistics.

Instead, EPC is single value (nondetect) = <0.013

2-Methylnaphthalene

Total Number of Data	18
Number of Non-Detect Data	15
Number of Detected Data	**3**
Minimum Detected	0.01
Maximum Detected	0.053
Percent Non-Detects	**83.33%**
Minimum Non-detect	0.01
Maximum Non-detect	0.0634
Mean of Detected Data	0.0362

Median of Detected Data	0.0456
Variance of Detected Data	5.29E-04
SD of Detected Data	0.023
CV of Detected Data	0.635
Skewness of Detected Data	-1.532
Mean of Detected log data	-3.543
SD of Detected Log data	0.923

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	18
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0146
SD	0.0127
Standard Error of Mean	0.00378
95% KM (t) UCL	0.0212
95% KM (z) UCL	0.0208
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.053
95% KM (Chebyshev) UCL	0.0311
97.5% KM (Chebyshev) UCL	0.0382
99% KM (Chebyshev) UCL	0.0522

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0118**
[per recommendation in ProUCL User Guide]

4,4'-DDE

Total Number of Data	18
Number of Non-Detect Data	16

Number of Detected Data	**2**
Minimum Detected	0.00216
Maximum Detected	0.0149
Percent Non-Detects	**88.89%**
Minimum Non-detect	3.83E-04
Maximum Non-detect	0.00252
Mean of Detected Data	0.00853
Median of Detected Data	0.00853
Variance of Detected Data	8.12E-05
SD of Detected Data	0.00901
CV of Detected Data	1.056
Skewness of Detected Data	N/A
Mean of Detected log data	-5.172
SD of Detected Log data	1.366

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00287
SD	0.00292
Standard Error of Mean	9.73E-04
95% KM (t) UCL	0.00456
95% KM (z) UCL	0.00447
95% KM (BCA) UCL	0.0149
95% KM (Percentile Bootstrap) UCL	0.0149
95% KM (Chebyshev) UCL	0.00711
97.5% KM (Chebyshev) UCL	0.00894

99% KM (Chebyshev) UCL	0.0125

Potential UCL to Use

95% KM (BCA) UCL	0.0149

**** Instead of UCL, EPC is selected to be median =** **<0.000424**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.000597
Maximum Detected	0.0108
Percent Non-Detects	**61.11%**
Minimum Non-detect	1.48E-04
Maximum Non-detect	0.00282
Mean of Detected Data	0.0029
Median of Detected Data	0.00122
Variance of Detected Data	1.38E-05
SD of Detected Data	0.00372
CV of Detected Data	1.282
Skewness of Detected Data	2.085
Mean of Detected log data	-6.377
SD of Detected Log data	1.031

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	16
Number treated as Detected	2
Single DL Percent Detection	88.89%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0015
SD	0.00242
Standard Error of Mean	6.17E-04
95% KM (t) UCL	0.00257
95% KM (z) UCL	0.00252

95% KM (BCA) UCL	0.0031
95% KM (Percentile Bootstrap) UCL	0.00269
95% KM (Chebyshev) UCL	0.00419
97.5% KM (Chebyshev) UCL	0.00535
99% KM (Chebyshev) UCL	0.00764

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000545**
[per recommendation in ProUCL User Guide]

Acenaphthene

Total Number of Data	18
Number of Non-Detect Data	16
Number of Detected Data	**2**
Minimum Detected	0.021
Maximum Detected	0.157
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.01
Maximum Non-detect	0.0583
Mean of Detected Data	0.089
Median of Detected Data	0.089
Variance of Detected Data	0.00925
SD of Detected Data	0.0962
CV of Detected Data	1.081
Skewness of Detected Data	N/A
Mean of Detected log data	-2.857
SD of Detected Log data	1.423

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0286
SD	0.0312
Standard Error of Mean	0.0104
95% KM (t) UCL	0.0466
95% KM (z) UCL	0.0456
95% KM (BCA) UCL	0.157
95% KM (Percentile Bootstrap) UCL	0.157
95% KM (Chebyshev) UCL	0.0738
97.5% KM (Chebyshev) UCL	0.0934
99% KM (Chebyshev) UCL	0.132

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Acenaphthylene

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.0555
Maximum Detected	0.0555
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00768
Maximum Non-detect	0.0661

Data set has all detected values equal to = 0.0555, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0555

**** Instead of UCL, EPC is selected to be median = <0.0121**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	1810
Maximum	16800
Mean	10673
Median	10300
SD	3687

Variance	13591176
Coefficient of Variation	0.345
Skewness	-0.368
Mean of log data	9.189
SD of log data	0.496

95% Useful UCLs	
Student's-t UCL	**12185**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12022
95% Modified-t UCL	12172

Non-Parametric UCLs	
95% CLT UCL	12103
95% Jackknife UCL	12185
95% Standard Bootstrap UCL	12058
95% Bootstrap-t UCL	12081
95% Hall's Bootstrap UCL	12129
95% Percentile Bootstrap UCL	12001
95% BCA Bootstrap UCL	12048
95% Chebyshev(Mean, Sd) UCL	14461
97.5% Chebyshev(Mean, Sd) UCL	16100
99% Chebyshev(Mean, Sd) UCL	19319

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.00887
Maximum Detected	0.264
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.00744
Maximum Non-detect	0.0641

Mean of Detected Data	0.089
Median of Detected Data	0.0415
Variance of Detected Data	0.0139
SD of Detected Data	0.118
CV of Detected Data	1.326
Skewness of Detected Data	1.872
Mean of Detected log data	-3.119
SD of Detected Log data	1.402

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0269
SD	0.0585
Standard Error of Mean	0.016
95% KM (t) UCL	0.0546
95% KM (z) UCL	0.0531
95% KM (BCA) UCL	0.264
95% KM (Percentile Bootstrap) UCL	0.0836
95% KM (Chebyshev) UCL	0.0964
97.5% KM (Chebyshev) UCL	0.127
99% KM (Chebyshev) UCL	0.186

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0121**
[per recommendation in ProUCL User Guide]

Antimony

Total Number of Data	18
Number of Non-Detect Data	9
Number of Detected Data	**9**
Minimum Detected	1.66
Maximum Detected	8.09
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.19
Maximum Non-detect	0.25

Mean of Detected Data	3.373
Median of Detected Data	2.62
Variance of Detected Data	3.814
SD of Detected Data	1.953
CV of Detected Data	0.579
Skewness of Detected Data	2.131
Mean of Detected log data	1.107
SD of Detected Log data	0.461

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	2.517
SD	1.559
Standard Error of Mean	0.39
95% KM (t) UCL	3.194
95% KM (z) UCL	3.158
95% KM (BCA) UCL	3.612
95% KM (Percentile Bootstrap) UCL	3.351
95% KM (Chebyshev) UCL	4.215
97.5% KM (Chebyshev) UCL	**4.95**
99% KM (Chebyshev) UCL	6.394

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Aroclor-1254

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.0122
Maximum Detected	0.0122
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00383
Maximum Non-detect	0.031

Data set has all detected values equal to = 0.0122, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0122

**** Instead of UCL, EPC is selected to be median = <0.00429**
[per recommendation in ProUCL User Guide]

Arsenic

Total Number of Data	18
Number of Non-Detect Data	1
Number of Detected Data	**17**
Minimum Detected	0.54
Maximum Detected	5.69
Percent Non-Detects	**5.56%**
Minimum Non-detect	0.68
Maximum Non-detect	0.68
Mean of Detected Data	2.651
Median of Detected Data	2.55
Variance of Detected Data	1.123
SD of Detected Data	1.06
CV of Detected Data	0.4
Skewness of Detected Data	1.143
Mean of Detected log data	0.887
SD of Detected Log data	0.476

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.476
Mean	2.526
SD	0.59
95% Winsor (t) UCL	2.772
Kaplan Meier (KM) Method	
Mean	2.533
SD	1.11
Standard Error of Mean	0.27
95% KM (t) UCL	3.002
95% KM (z) UCL	2.977
95% KM (BCA) UCL	3.069
95% KM (Percentile Bootstrap) UCL	3.002
95% KM (Chebyshev) UCL	3.709
97.5% KM (Chebyshev) UCL	**4.218**
99% KM (Chebyshev) UCL	5.217

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Barium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	46.1
Maximum	476
Mean	145.2
Median	114
SD	115.8

Variance	13417
Coefficient of Variation	0.798
Skewness	2.357
Mean of log data	4.783
SD of log data	0.59

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	192.6
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	206.3
95% Modified-t UCL	195.2
Non-Parametric UCLs	
95% CLT UCL	190.1
95% Jackknife UCL	192.6
95% Standard Bootstrap UCL	189.6
95% Bootstrap-t UCL	287.9
95% Hall's Bootstrap UCL	491.4
95% Percentile Bootstrap UCL	196.4
95% BCA Bootstrap UCL	207.9
95% Chebyshev(Mean, Sd) UCL	264.2
97.5% Chebyshev(Mean, Sd) UCL	315.6
99% Chebyshev(Mean, Sd) UCL	416.8

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **264.2**

Benzo(a)anthracene

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	1.18
Maximum Detected	1.18
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00503
Maximum Non-detect	1.18

Data set has all detected values equal to = 1.18, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 1.18

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.0135
Maximum Detected	1.42
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.00901
Maximum Non-detect	0.0117

Mean of Detected Data	0.284
Median of Detected Data	0.103
Variance of Detected Data	0.253
SD of Detected Data	0.503
CV of Detected Data	1.773
Skewness of Detected Data	2.591
Mean of Detected log data	-2.178
SD of Detected Log data	1.387

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.119
SD	0.319
Standard Error of Mean	0.0813
95% KM (t) UCL	0.26
95% KM (z) UCL	0.252
95% KM (BCA) UCL	0.305
95% KM (Percentile Bootstrap) UCL	0.273
95% KM (Chebyshev) UCL	0.473
97.5% KM (Chebyshev) UCL	0.626
99% KM (Chebyshev) UCL	0.927

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0116**
[per recommendation in ProUCL User Guide]

Benzo(b)fluoranthene

Total Number of Data	18
Number of Non-Detect Data	10
Number of Detected Data	**8**
Minimum Detected	0.0487
Maximum Detected	1.62
Percent Non-Detects	**55.56%**
Minimum Non-detect	0.00721
Maximum Non-detect	0.0497

Mean of Detected Data	0.318
Median of Detected Data	0.13
Variance of Detected Data	0.279
SD of Detected Data	0.528
CV of Detected Data	1.659
Skewness of Detected Data	2.777
Mean of Detected log data	-1.785
SD of Detected Log data	1.019

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	11
Number treated as Detected	7
Single DL Percent Detection	61.11%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.169
SD	0.356
Standard Error of Mean	0.0896
95% KM (t) UCL	0.325
95% KM (z) UCL	0.316
95% KM (BCA) UCL	0.373
95% KM (Percentile Bootstrap) UCL	0.339
95% KM (Chebyshev) UCL	0.559
97.5% KM (Chebyshev) UCL	0.728
99% KM (Chebyshev) UCL	1.06

Potential UCL to Use
95% KM (BCA) UCL **0.373**

Benzo(g,h,i)perylene

Total Number of Data	18
Number of Non-Detect Data	8
Number of Detected Data	**10**
Minimum Detected	0.0237
Maximum Detected	1.28
Percent Non-Detects	**44.44%**
Minimum Non-detect	0.0103
Maximum Non-detect	0.0116
Mean of Detected Data	0.234
Median of Detected Data	0.0895
Variance of Detected Data	0.147
SD of Detected Data	0.384
CV of Detected Data	1.642
Skewness of Detected Data	2.721
Mean of Detected log data	-2.257
SD of Detected Log data	1.245

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.14
SD	0.291
Standard Error of Mean	0.0723
95% KM (t) UCL	0.266
95% KM (z) UCL	0.259
95% KM (BCA) UCL	0.288
95% KM (Percentile Bootstrap) UCL	0.277
95% KM (Chebyshev) UCL	0.455
97.5% KM (Chebyshev) UCL	**0.592**
99% KM (Chebyshev) UCL	0.859

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Benzo(k)fluoranthene

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.068

Maximum Detected	0.799
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.011
Maximum Non-detect	0.0916

Mean of Detected Data	0.272
Median of Detected Data	0.111
Variance of Detected Data	0.124
SD of Detected Data	0.353
CV of Detected Data	1.296
Skewness of Detected Data	1.949
Mean of Detected log data	-1.849
SD of Detected Log data	1.13

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	16
Number treated as Detected	2
Single DL Percent Detection	88.89%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.113
SD	0.167
Standard Error of Mean	0.0455
95% KM (t) UCL	0.193
95% KM (z) UCL	0.188
95% KM (BCA) UCL	0.799
95% KM (Percentile Bootstrap) UCL	0.252
95% KM (Chebyshev) UCL	0.312
97.5% KM (Chebyshev) UCL	0.398
99% KM (Chebyshev) UCL	0.566

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0175**
[per recommendation in ProUCL User Guide]

Beryllium

Total Number of Data	18
Number of Non-Detect Data	1
Number of Detected Data	**17**
Minimum Detected	0.066
Maximum Detected	2.88
Percent Non-Detects	**5.56%**
Minimum Non-detect	0.026
Maximum Non-detect	0.026
Mean of Detected Data	0.749
Median of Detected Data	0.66
Variance of Detected Data	0.356
SD of Detected Data	0.597
CV of Detected Data	0.797
Skewness of Detected Data	3.046
Mean of Detected log data	-0.528
SD of Detected Log data	0.774

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	0.774
Mean	0.605
SD	0.277
95% Winsor (t) UCL	0.72
Kaplan Meier (KM) Method	
Mean	0.711
SD	0.584
Standard Error of Mean	0.142
95% KM (t) UCL	0.958
95% KM (z) UCL	0.944
95% KM (BCA) UCL	0.995
95% KM (Percentile Bootstrap) UCL	0.959
95% KM (Chebyshev) UCL	1.329
97.5% KM (Chebyshev) UCL	**1.597**
99% KM (Chebyshev) UCL	2.123

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Bis(2-Ethylhexyl)phthalate

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.0122
Maximum Detected	0.239
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.046
Maximum Non-detect	0.105

Mean of Detected Data	0.0693
Median of Detected Data	0.0532
Variance of Detected Data	0.00595
SD of Detected Data	0.0771
CV of Detected Data	1.113
Skewness of Detected Data	2.321
Mean of Detected log data	-3.069
SD of Detected Log data	0.937

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0445
SD	0.0502
Standard Error of Mean	0.0138
95% KM (t) UCL	0.0685
95% KM (z) UCL	0.0672
95% KM (BCA) UCL	0.076
95% KM (Percentile Bootstrap) UCL	0.0695
95% KM (Chebyshev) UCL	0.105
97.5% KM (Chebyshev) UCL	0.131
99% KM (Chebyshev) UCL	0.182

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0546**
[per recommendation in ProUCL User Guide]

Boron

Total Number of Data	18
Number of Non-Detect Data	5
Number of Detected Data	**13**
Minimum Detected	3.15

Maximum Detected	39.2
Percent Non-Detects	**27.78%**
Minimum Non-detect	1.11
Maximum Non-detect	1.25

Mean of Detected Data	10.89
Median of Detected Data	9
Variance of Detected Data	95.21
SD of Detected Data	9.757
CV of Detected Data	0.896
Skewness of Detected Data	2.309
Mean of Detected log data	2.125
SD of Detected Log data	0.713

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	0.713
Mean	5.999
SD	2.737
95% Winsor (t) UCL	7.221

Kaplan Meier (KM) Method	
Mean	8.743
SD	8.689
Standard Error of Mean	2.132
95% KM (t) UCL	12.45
95% KM (z) UCL	12.25
95% KM (BCA) UCL	12.91
95% KM (Percentile Bootstrap) UCL	12.43
95% KM (Chebyshev) UCL	18.03
97.5% KM (Chebyshev) UCL	**22.06**
99% KM (Chebyshev) UCL	29.95

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Butyl benzyl phthalate

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.151
Maximum Detected	0.151
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00913
Maximum Non-detect	0.0733

Data set has all detected values equal to = 0.151, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.151

**** Instead of UCL, EPC is selected to be median = <0.0136**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data	18
Number of Non-Detect Data	10
Number of Detected Data	**8**
Minimum Detected	0.28
Maximum Detected	0.8
Percent Non-Detects	**55.56%**
Minimum Non-detect	0.006
Maximum Non-detect	0.033
Mean of Detected Data	0.455
Median of Detected Data	0.385
Variance of Detected Data	0.028
SD of Detected Data	0.167
CV of Detected Data	0.368
Skewness of Detected Data	1.539
Mean of Detected log data	-0.838
SD of Detected Log data	0.327

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.358
SD	0.136
Standard Error of Mean	0.0342
95% KM (t) UCL	0.417
95% KM (z) UCL	0.414
95% KM (BCA) UCL	0.467
95% KM (Percentile Bootstrap) UCL	0.45

95% KM (Chebyshev) UCL	0.507
97.5% KM (Chebyshev) UCL	**0.572**
99% KM (Chebyshev) UCL	0.698

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Carbazole

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.013
Maximum Detected	0.128
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.00965
Maximum Non-detect	0.0578

Mean of Detected Data	0.0445
Median of Detected Data	0.0185
Variance of Detected Data	0.00311
SD of Detected Data	0.0557
CV of Detected Data	1.252
Skewness of Detected Data	1.987
Mean of Detected log data	-3.595
SD of Detected Log data	1.04

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.02
SD	0.0262
Standard Error of Mean	0.00714
95% KM (t) UCL	0.0325
95% KM (z) UCL	0.0318
95% KM (BCA) UCL	0.128

95% KM (Percentile Bootstrap) UCL	0.0388
95% KM (Chebyshev) UCL	0.0512
97.5% KM (Chebyshev) UCL	0.0647
99% KM (Chebyshev) UCL	0.0911

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

**** Instead of UCL, EPC is selected to be median =**	**<0.0111**
[per recommendation in ProUCL User Guide]	

Chromium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	7.9
Maximum	128
Mean	20.26
Median	11.6
SD	27.58
Variance	760.5
Coefficient of Variation	1.361
Skewness	3.912
Mean of log data	2.683
SD of log data	0.658

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	31.56
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	37.35
95% Modified-t UCL	32.56
Non-Parametric UCLs	
95% CLT UCL	30.95
95% Jackknife UCL	31.56
95% Standard Bootstrap UCL	30.37
95% Bootstrap-t UCL	66.91
95% Hall's Bootstrap UCL	67.88
95% Percentile Bootstrap UCL	32.64
95% BCA Bootstrap UCL	40.53
95% Chebyshev(Mean, Sd) UCL	48.59
97.5% Chebyshev(Mean, Sd) UCL	60.85
99% Chebyshev(Mean, Sd) UCL	84.93

Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**48.59**

Chrysene

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.011
Maximum Detected	1.3
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.00911
Maximum Non-detect	0.0523
Mean of Detected Data	0.253
Median of Detected Data	0.115
Variance of Detected Data	0.216
SD of Detected Data	0.465
CV of Detected Data	1.838
Skewness of Detected Data	2.58
Mean of Detected log data	-2.455
SD of Detected Log data	1.543

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	13
Number treated as Detected	5
Single DL Percent Detection	72.22%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.105
SD	0.293
Standard Error of Mean	0.0746
95% KM (t) UCL	0.235
95% KM (z) UCL	0.228
95% KM (BCA) UCL	0.323
95% KM (Percentile Bootstrap) UCL	0.248
95% KM (Chebyshev) UCL	0.43
97.5% KM (Chebyshev) UCL	0.571
99% KM (Chebyshev) UCL	0.847

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0103**
[per recommendation in ProUCL User Guide]

Cobalt

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	2.81
Maximum	7.87
Mean	5.789
Median	5.84
SD	1.506
Variance	2.268
Coefficient of Variation	0.26
Skewness	-0.505
Mean of log data	1.718
SD of log data	0.299
95% Useful UCLs	
Student's-t UCL	**6.406**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	6.328
95% Modified-t UCL	6.399
Non-Parametric UCLs	
95% CLT UCL	6.373
95% Jackknife UCL	6.406
95% Standard Bootstrap UCL	6.352
95% Bootstrap-t UCL	6.376
95% Hall's Bootstrap UCL	6.339
95% Percentile Bootstrap UCL	6.363
95% BCA Bootstrap UCL	6.318
95% Chebyshev(Mean, Sd) UCL	7.336
97.5% Chebyshev(Mean, Sd) UCL	8.006
99% Chebyshev(Mean, Sd) UCL	9.321

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	5.9
Maximum	200
Mean	24.13
Median	9.895
SD	44.66
Variance	1994

Coefficient of Variation	1.851
Skewness	4.008
Mean of log data	2.621
SD of log data	0.865

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	42.44
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	52.07
95% Modified-t UCL	44.1
Non-Parametric UCLs	
95% CLT UCL	41.44
95% Jackknife UCL	42.44
95% Standard Bootstrap UCL	40.65
95% Bootstrap-t UCL	100.8
95% Hall's Bootstrap UCL	104
95% Percentile Bootstrap UCL	44.65
95% BCA Bootstrap UCL	56.68
95% Chebyshev(Mean, Sd) UCL	70.01
97.5% Chebyshev(Mean, Sd) UCL	89.86
99% Chebyshev(Mean, Sd) UCL	128.9

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **70.01**

Dibenz(a,h)anthracene

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.045
Maximum Detected	0.404
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.00687
Maximum Non-detect	0.0565
Mean of Detected Data	0.189
Median of Detected Data	0.153
Variance of Detected Data	0.0233
SD of Detected Data	0.153
CV of Detected Data	0.81
Skewness of Detected Data	1.295
Mean of Detected log data	-1.944
SD of Detected Log data	0.902

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	15
Number treated as Detected	3
Single DL Percent Detection	83.33%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0769
SD	0.0863
Standard Error of Mean	0.0235
95% KM (t) UCL	0.118
95% KM (z) UCL	0.116
95% KM (BCA) UCL	0.192
95% KM (Percentile Bootstrap) UCL	0.192
95% KM (Chebyshev) UCL	0.179
97.5% KM (Chebyshev) UCL	0.224
99% KM (Chebyshev) UCL	0.311

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.0862
Maximum Detected	0.0862
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00606
Maximum Non-detect	0.083

Data set has all detected values equal to = 0.0862, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0862

**** Instead of UCL, EPC is selected to be median = <0.0152**
[per recommendation in ProUCL User Guide]

Dieldrin

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.00545
Maximum Detected	0.00545
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.000165
Maximum Non-detect	0.00246

Data set has all detected values equal to = 0.00545, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00545

**** Instead of UCL, EPC is selected to be median = <0.000183**
[per recommendation in ProUCL User Guide]

Diethyl phthalate

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.011
Maximum Detected	0.011
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00756
Maximum Non-detect	0.0996

Data set has all detected values equal to = 0.011, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.011

**** Instead of UCL, EPC is selected to be median = <0.0185**
[per recommendation in ProUCL User Guide]

Di-n-butyl phthalate

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.01
Maximum Detected	0.01
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.00797
Maximum Non-detect	0.167

Data set has all detected values equal to = 0.01, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.01

**** Instead of UCL, EPC is selected to be median = <0.0310**
[per recommendation in ProUCL User Guide]

Di-n-octyl phthalate

Total Number of Data	18
Number of Non-Detect Data	16
Number of Detected Data	**2**
Minimum Detected	0.0154
Maximum Detected	0.123
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00848
Maximum Non-detect	0.0487
Mean of Detected Data	0.0692
Median of Detected Data	0.0692
Variance of Detected Data	0.00579
SD of Detected Data	0.0761
CV of Detected Data	1.099
Skewness of Detected Data	N/A
Mean of Detected log data	-3.134
SD of Detected Log data	1.469

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0214
SD	0.0246
Standard Error of Mean	0.00822
95% KM (t) UCL	0.0357
95% KM (z) UCL	0.0349
95% KM (BCA) UCL	0.123
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0572
97.5% KM (Chebyshev) UCL	0.0727
99% KM (Chebyshev) UCL	0.103

Potential UCL to Use	
95% KM (BCA) UCL	0.123

**** Instead of UCL, EPC is selected to be median = <0.00950**
[per recommendation in ProUCL User Guide]

Endrin

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.00149
Maximum Detected	0.00149
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.0002
Maximum Non-detect	0.00295

Data set has all detected values equal to = 0.00149, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00149

**** Instead of UCL, EPC is selected to be median = <0.000222**
[per recommendation in ProUCL User Guide]

Endrin ketone

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.00966
Maximum Detected	0.00966
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.000495

Maximum Non-detect	0.00298

Data set has all detected values equal to = 0.00966, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00966

**** Instead of UCL, EPC is selected to be median = <0.000548**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	18
Number of Non-Detect Data	12
Number of Detected Data	**6**
Minimum Detected	0.0214
Maximum Detected	2.19
Percent Non-Detects	**66.67%**
Minimum Non-detect	0.00676
Maximum Non-detect	0.0658
Mean of Detected Data	0.462
Median of Detected Data	0.125
Variance of Detected Data	0.724
SD of Detected Data	0.851
CV of Detected Data	1.843
Skewness of Detected Data	2.395
Mean of Detected log data	-1.942
SD of Detected Log data	1.595

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	14
Number treated as Detected	4
Single DL Percent Detection	77.78%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.168
SD	0.494
Standard Error of Mean	0.128

95% KM (t) UCL	0.39
95% KM (z) UCL	0.378
95% KM (BCA) UCL	0.447
95% KM (Percentile Bootstrap) UCL	0.416
95% KM (Chebyshev) UCL	0.725
97.5% KM (Chebyshev) UCL	0.965
99% KM (Chebyshev) UCL	1.438

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0128**
[per recommendation in ProUCL User Guide]

Fluorene

Total Number of Data	18
Number of Non-Detect Data	15
Number of Detected Data	**3**
Minimum Detected	0.017
Maximum Detected	0.141
Percent Non-Detects	**83.33%**
Minimum Non-detect	0.00689
Maximum Non-detect	0.0575
Mean of Detected Data	0.0647
Median of Detected Data	0.036
Variance of Detected Data	0.00446
SD of Detected Data	0.0668
CV of Detected Data	1.033
Skewness of Detected Data	1.576
Mean of Detected log data	-3.119
SD of Detected Log data	1.073

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.025
SD	0.0285
Standard Error of Mean	0.00823
95% KM (t) UCL	0.0393
95% KM (z) UCL	0.0385
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.141
95% KM (Chebyshev) UCL	0.0609
97.5% KM (Chebyshev) UCL	0.0764
99% KM (Chebyshev) UCL	0.107

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0109**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	18
Number of Non-Detect Data	9
Number of Detected Data	**9**
Minimum Detected	0.02
Maximum Detected	1.51
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.0165
Maximum Non-detect	0.095

Mean of Detected Data	0.289
Median of Detected Data	0.149
Variance of Detected Data	0.215
SD of Detected Data	0.464
CV of Detected Data	1.604
Skewness of Detected Data	2.851
Mean of Detected log data	-1.916
SD of Detected Log data	1.153

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	12
Number treated as Detected	6
Single DL Percent Detection	66.67%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.155
SD	0.337
Standard Error of Mean	0.0843
95% KM (t) UCL	0.302
95% KM (z) UCL	0.294
95% KM (BCA) UCL	0.333
95% KM (Percentile Bootstrap) UCL	0.317
95% KM (Chebyshev) UCL	0.523
97.5% KM (Chebyshev) UCL	**0.682**
99% KM (Chebyshev) UCL	0.994

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Iron

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	8450
Maximum	102000
Mean	19477
Median	14700
SD	21073
Variance	4.44E+08
Coefficient of Variation	1.082
Skewness	3.929
Mean of log data	9.653
SD of log data	0.564

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	28117
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	32561
95% Modified-t UCL	28884
Non-Parametric UCLs	
95% CLT UCL	27646
95% Jackknife UCL	28117
95% Standard Bootstrap UCL	27671

95% Bootstrap-t UCL	49011
95% Hall's Bootstrap UCL	60240
95% Percentile Bootstrap UCL	29148
95% BCA Bootstrap UCL	33973
95% Chebyshev(Mean, Sd) UCL	41127
97.5% Chebyshev(Mean, Sd) UCL	50495
99% Chebyshev(Mean, Sd) UCL	68897

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	**41127**

Lead

Number of Valid Observations	18
Number of Distinct Observations	16
Minimum	8.22
Maximum	471
Mean	57.7
Median	17.1
SD	111.1
Variance	12345
Coefficient of Variation	1.926
Skewness	3.403
Mean of log data	3.182
SD of log data	1.161

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	103.3
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	123.2
95% Modified-t UCL	106.8
Non-Parametric UCLs	
95% CLT UCL	100.8
95% Jackknife UCL	103.3
95% Standard Bootstrap UCL	98.59
95% Bootstrap-t UCL	189.9
95% Hall's Bootstrap UCL	228.1
95% Percentile Bootstrap UCL	106.1
95% BCA Bootstrap UCL	131.6
95% Chebyshev(Mean, Sd) UCL	171.9
97.5% Chebyshev(Mean, Sd) UCL	221.2
99% Chebyshev(Mean, Sd) UCL	318.3

Potential UCL to Use

99% Chebyshev(Mean, Sd) UCL	**318.3**

Lithium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	2.59
Maximum	26.6
Mean	16.57
Median	16.15
SD	5.136
Variance	26.38
Coefficient of Variation	0.31
Skewness	-0.697
Mean of log data	2.729
SD of log data	0.49
95% Useful UCLs	
Student's-t UCL	**18.68**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	18.35
95% Modified-t UCL	18.64
Non-Parametric UCLs	
95% CLT UCL	18.56
95% Jackknife UCL	18.68
95% Standard Bootstrap UCL	18.5
95% Bootstrap-t UCL	18.59
95% Hall's Bootstrap UCL	18.58
95% Percentile Bootstrap UCL	18.48
95% BCA Bootstrap UCL	18.33
95% Chebyshev(Mean, Sd) UCL	21.85
97.5% Chebyshev(Mean, Sd) UCL	24.13
99% Chebyshev(Mean, Sd) UCL	28.62

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	82.3
Maximum	1210
Mean	369.5
Median	296
SD	247.7
Variance	61331
Coefficient of Variation	0.67
Skewness	2.484
Mean of log data	5.754
SD of log data	0.565

95% Useful UCLs	
Student's-t UCL	471
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	502
95% Modified-t UCL	476.7
Non-Parametric UCLs	
95% CLT UCL	465.5
95% Jackknife UCL	471
95% Standard Bootstrap UCL	463.6
95% Bootstrap-t UCL	537.6
95% Hall's Bootstrap UCL	893.1
95% Percentile Bootstrap UCL	466.1
95% BCA Bootstrap UCL	496.7
95% Chebyshev(Mean, Sd) UCL	623.9
97.5% Chebyshev(Mean, Sd) UCL	**734**
99% Chebyshev(Mean, Sd) UCL	950.3

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Mercury

Total Number of Data	18
Number of Non-Detect Data	10
Number of Detected Data	**8**
Minimum Detected	0.006
Maximum Detected	0.064
Percent Non-Detects	**55.56%**
Minimum Non-detect	0.0023
Maximum Non-detect	0.025
Mean of Detected Data	0.0229
Median of Detected Data	0.0165
Variance of Detected Data	3.98E-04
SD of Detected Data	0.0199
CV of Detected Data	0.872
Skewness of Detected Data	1.451
Mean of Detected log data	-4.096
SD of Detected Log data	0.853

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	15
Number treated as Detected	3
Single DL Percent Detection	83.33%

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0138
SD	0.0149
Standard Error of Mean	0.00379
95% KM (t) UCL	0.0204
95% KM (z) UCL	0.0201
95% KM (BCA) UCL	0.0227
95% KM (Percentile Bootstrap) UCL	0.0213
95% KM (Chebyshev) UCL	0.0303
97.5% KM (Chebyshev) UCL	**0.0375**
99% KM (Chebyshev) UCL	0.0515

Data appear Normal (0.05)
May want to try Normal UCLs

Molybdenum

Total Number of Data	18
Number of Non-Detect Data	7
Number of Detected Data	**11**
Minimum Detected	0.085
Maximum Detected	10.7
Percent Non-Detects	**38.89%**
Minimum Non-detect	0.074
Maximum Non-detect	0.084
Mean of Detected Data	1.527
Median of Detected Data	0.26
Variance of Detected Data	9.681
SD of Detected Data	3.111
CV of Detected Data	2.038
Skewness of Detected Data	3.066
Mean of Detected log data	-0.802
SD of Detected Log data	1.546

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	1.546
Mean	0.112
SD	0.0267
95% Winsor (t) UCL	0.127

Kaplan Meier (KM) Method	
Mean	0.966
SD	2.423
Standard Error of Mean	0.599
95% KM (t) UCL	2.008
95% KM (z) UCL	1.951
95% KM (BCA) UCL	2.184
95% KM (Percentile Bootstrap) UCL	2.068
95% KM (Chebyshev) UCL	3.577
97.5% KM (Chebyshev) UCL	**4.707**
99% KM (Chebyshev) UCL	6.927

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Nickel

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	11.7
Maximum	51.7
Mean	17.04
Median	14.6
SD	9.054
Variance	81.97
Coefficient of Variation	0.531
Skewness	3.644
Mean of log data	2.762
SD of log data	0.343

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	20.76
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	22.51
95% Modified-t UCL	21.06
Non-Parametric UCLs	
95% CLT UCL	20.55
95% Jackknife UCL	20.76
95% Standard Bootstrap UCL	20.47
95% Bootstrap-t UCL	27.18
95% Hall's Bootstrap UCL	33.8
95% Percentile Bootstrap UCL	20.98

95% BCA Bootstrap UCL	23.37
95% Chebyshev(Mean, Sd) UCL	26.35
97.5% Chebyshev(Mean, Sd) UCL	30.37
99% Chebyshev(Mean, Sd) UCL	38.28

Potential UCL to Use

Use 95% Student's-t UCL	20.76
Or 95% Modified-t UCL	**21.06**

Phenanthrene

Total Number of Data	18
Number of Non-Detect Data	11
Number of Detected Data	**7**
Minimum Detected	0.018
Maximum Detected	1.34
Percent Non-Detects	**61.11%**
Minimum Non-detect	0.00729
Maximum Non-detect	0.0727

Mean of Detected Data	0.266
Median of Detected Data	0.041
Variance of Detected Data	0.231
SD of Detected Data	0.481
CV of Detected Data	1.805
Skewness of Detected Data	2.482
Mean of Detected log data	-2.452
SD of Detected Log data	1.542

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	15
Number treated as Detected	3
Single DL Percent Detection	83.33%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.115
SD	0.303
Standard Error of Mean	0.0771
95% KM (t) UCL	0.249

95% KM (z) UCL	0.242
95% KM (BCA) UCL	0.265
95% KM (Percentile Bootstrap) UCL	0.261
95% KM (Chebyshev) UCL	0.451
97.5% KM (Chebyshev) UCL	0.596
99% KM (Chebyshev) UCL	0.882

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0142**
[per recommendation in ProUCL User Guide]

Pyrene

Total Number of Data	19
Number of Non-Detect Data	10
Number of Detected Data	**9**
Minimum Detected	0.0149
Maximum Detected	4.64
Percent Non-Detects	**52.63%**
Minimum Non-detect	0.0122
Maximum Non-detect	0.0702

Mean of Detected Data	0.798
Median of Detected Data	0.091
Variance of Detected Data	2.426
SD of Detected Data	1.558
CV of Detected Data	1.951
Skewness of Detected Data	2.356
Mean of Detected log data	-1.978
SD of Detected Log data	2.019

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	13
Number treated as Detected	6
Single DL Percent Detection	68.42%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.386
SD	1.084
Standard Error of Mean	0.264
95% KM (t) UCL	0.843
95% KM (z) UCL	0.82
95% KM (BCA) UCL	0.898
95% KM (Percentile Bootstrap) UCL	0.866
95% KM (Chebyshev) UCL	1.536
97.5% KM (Chebyshev) UCL	**2.033**
99% KM (Chebyshev) UCL	3.01

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Silver

Total Number of Data	18
Number of Non-Detect Data	16
Number of Detected Data	**2**
Minimum Detected	0.092
Maximum Detected	0.41
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.027
Maximum Non-detect	0.15

Mean of Detected Data	0.251
Median of Detected Data	0.251
Variance of Detected Data	0.0506
SD of Detected Data	0.225
CV of Detected Data	0.896
Skewness of Detected Data	N/A
Mean of Detected log data	-1.639
SD of Detected Log data	1.057

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.11
SD	0.0728
Standard Error of Mean	0.0243
95% KM (t) UCL	0.152
95% KM (z) UCL	0.15
95% KM (BCA) UCL	0.41
95% KM (Percentile Bootstrap) UCL	0.41
95% KM (Chebyshev) UCL	0.216
97.5% KM (Chebyshev) UCL	0.261
99% KM (Chebyshev) UCL	0.351
Potential UCL to Use	
95% KM (BCA) UCL	0.41

**** Instead of UCL, EPC is selected to be median = <0.0600**
[per recommendation in ProUCL User Guide]

Strontium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	26.6
Maximum	93.6
Mean	57.32
Median	52.85
SD	19.7
Variance	388.2
Coefficient of Variation	0.344
Skewness	0.325
Mean of log data	3.989
SD of log data	0.364
95% Useful UCLs	
Student's-t UCL	**65.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	65.34
95% Modified-t UCL	65.45
Non-Parametric UCLs	
95% CLT UCL	64.96

95% Jackknife UCL	65.4
95% Standard Bootstrap UCL	64.55
95% Bootstrap-t UCL	66.09
95% Hall's Bootstrap UCL	65.38
95% Percentile Bootstrap UCL	64.71
95% BCA Bootstrap UCL	64.87
95% Chebyshev(Mean, Sd) UCL	77.56
97.5% Chebyshev(Mean, Sd) UCL	86.32
99% Chebyshev(Mean, Sd) UCL	103.5

Data appear Normal (0.05)
May want to try Normal UCLs

Thallium

Total Number of Data	18
Number of Non-Detect Data	17
Number of Detected Data	**1**
Minimum Detected	0.63
Maximum Detected	0.63
Percent Non-Detects	**94.44%**
Minimum Non-detect	0.091
Maximum Non-detect	0.89

Data set has all detected values equal to = 0.63, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.63

**** Instead of UCL, EPC is selected to be median = <0.100**
[per recommendation in ProUCL User Guide]

Tin

Total Number of Data	18
Number of Non-Detect Data	14
Number of Detected Data	**4**
Minimum Detected	0.68
Maximum Detected	3.67
Percent Non-Detects	**77.78%**
Minimum Non-detect	0.39
Maximum Non-detect	2.17

Mean of Detected Data	1.673
Median of Detected Data	1.17
Variance of Detected Data	1.962
SD of Detected Data	1.401
CV of Detected Data	0.837
Skewness of Detected Data	1.487
Mean of Detected log data	0.267

SD of Detected Log data	0.795

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	17
Number treated as Detected	1
Single DL Percent Detection	94.44%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.904
SD	0.706
Standard Error of Mean	0.193
95% KM (t) UCL	1.239
95% KM (z) UCL	1.221
95% KM (BCA) UCL	3.67
95% KM (Percentile Bootstrap) UCL	1.848
95% KM (Chebyshev) UCL	1.744
97.5% KM (Chebyshev) UCL	2.108
99% KM (Chebyshev) UCL	2.822

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.590**
[per recommendation in ProUCL User Guide]

Titanium

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	3.41
Maximum	55.9
Mean	20.67
Median	18.7
SD	11.65
Variance	135.7
Coefficient of Variation	0.563
Skewness	1.656
Mean of log data	2.882
SD of log data	0.591

95% Useful UCLs	
Student's-t UCL	25.45
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	26.33
95% Modified-t UCL	25.63
Non-Parametric UCLs	
95% CLT UCL	25.19
95% Jackknife UCL	25.45
95% Standard Bootstrap UCL	24.96
95% Bootstrap-t UCL	27.41
95% Hall's Bootstrap UCL	33.8
95% Percentile Bootstrap UCL	25.5
95% BCA Bootstrap UCL	26.63
95% Chebyshev(Mean, Sd) UCL	32.64
97.5% Chebyshev(Mean, Sd) UCL	**37.82**
99% Chebyshev(Mean, Sd) UCL	47.99

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Vanadium

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	7.85
Maximum	45.8
Mean	19.66
Median	18.65
SD	9.126
Variance	83.28
Coefficient of Variation	0.464
Skewness	1.322
Mean of log data	2.884
SD of log data	0.449
95% Useful UCLs	
Student's-t UCL	**23.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	23.91
95% Modified-t UCL	23.51
Non-Parametric UCLs	
95% CLT UCL	23.2
95% Jackknife UCL	23.4
95% Standard Bootstrap UCL	23.07
95% Bootstrap-t UCL	24.51
95% Hall's Bootstrap UCL	25.38

95% Percentile Bootstrap UCL	23.28
95% BCA Bootstrap UCL	23.91
95% Chebyshev(Mean, Sd) UCL	29.03
97.5% Chebyshev(Mean, Sd) UCL	33.09
99% Chebyshev(Mean, Sd) UCL	41.06

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	29.5
Maximum	5640
Mean	418.4
Median	53.95
SD	1308
Variance	1709718
Coefficient of Variation	3.125
Skewness	4.195
Mean of log data	4.562
SD of log data	1.321

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	954.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	1251
95% Modified-t UCL	1005
Non-Parametric UCLs	
95% CLT UCL	925.3
95% Jackknife UCL	954.5
95% Standard Bootstrap UCL	913.4
95% Bootstrap-t UCL	5677
95% Hall's Bootstrap UCL	3640
95% Percentile Bootstrap UCL	1029
95% BCA Bootstrap UCL	1364
95% Chebyshev(Mean, Sd) UCL	1762
97.5% Chebyshev(Mean, Sd) UCL	2343
99% Chebyshev(Mean, Sd) UCL	3485

Potential UCL to Use
99% Chebyshev(Mean, Sd) UCL **3485**

APPENDIX A-4

NORTH OF MARLIN SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options		
From File	C:\Users\Michael\....\North of Marlin Soil Boring\North of Marlin Soil - all data\North of Marlin Soil - ECO all data_ProUCL input.wst	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

1,1-Dichloroethane

Total Number of Data	20
Number of Non-Detect Data	17
Number of Detected Data	**3**
Minimum Detected	0.00161
Maximum Detected	0.518
Percent Non-Detects	**85.00%**
Minimum Non-detect	1.28E-04
Maximum Non-detect	0.00812
Mean of Detected Data	0.177
Median of Detected Data	0.0121
Variance of Detected Data	0.0871
SD of Detected Data	0.295
CV of Detected Data	1.665
Skewness of Detected Data	1.73
Mean of Detected log data	-3.835
SD of Detected Log data	2.93

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	18
Number treated as Detected	2
Single DL Percent Detection	90.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.028
SD	0.112
Standard Error of Mean	0.0308
95% KM (t) UCL	0.0812
95% KM (z) UCL	0.0786

95% KM (BCA) UCL	0.518
95% KM (Percentile Bootstrap) UCL	0.518
95% KM (Chebyshev) UCL	0.162
97.5% KM (Chebyshev) UCL	0.22
99% KM (Chebyshev) UCL	0.334

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

***** Instead of UCL, EPC is selected to be median = <0.000175**
[per recommendation in ProUCL User Guide]

1,1-Dichloroethene

Total Number of Data	20
Number of Non-Detect Data	18
Number of Detected Data	**2**
Minimum Detected	0.00178
Maximum Detected	0.313
Percent Non-Detects	**90.00%**
Minimum Non-detect	2.90E-04
Maximum Non-detect	0.018

Mean of Detected Data	0.157
Median of Detected Data	0.157
Variance of Detected Data	0.0484
SD of Detected Data	0.22
CV of Detected Data	1.398
Skewness of Detected Data	N/A
Mean of Detected log data	-3.746
SD of Detected Log data	3.655

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	1
Single DL Percent Detection	95.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0173
SD	0.0678
Standard Error of Mean	0.0214
95% KM (t) UCL	0.0544
95% KM (z) UCL	0.0526
95% KM (BCA) UCL	0.313
95% KM (Percentile Bootstrap) UCL	0.313
95% KM (Chebyshev) UCL	0.111
97.5% KM (Chebyshev) UCL	0.151
99% KM (Chebyshev) UCL	0.231

Potential UCL to Use

99% KM (Chebyshev) UCL	0.231

***** Instead of UCL, EPC is selected to be median = <0.000387**
[per recommendation in ProUCL User Guide]

1,2-Dichloroethane

Total Number of Data	20
Number of Non-Detect Data	15
Number of Detected Data	**5**
Minimum Detected	0.00231
Maximum Detected	0.178
Percent Non-Detects	**75.00%**
Minimum Non-detect	9.20E-05
Maximum Non-detect	0.00526

Mean of Detected Data	0.0744
Median of Detected Data	0.011
Variance of Detected Data	0.00887
SD of Detected Data	0.0942
CV of Detected Data	1.266
Skewness of Detected Data	0.603
Mean of Detected log data	-3.934
SD of Detected Log data	2.091

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	3
Single DL Percent Detection	85.00%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0203
SD	0.0524
Standard Error of Mean	0.0131
95% KM (t) UCL	0.043
95% KM (z) UCL	0.0419
95% KM (BCA) UCL	0.177
95% KM (Percentile Bootstrap) UCL	0.0549
95% KM (Chebyshev) UCL	0.0775
97.5% KM (Chebyshev) UCL	0.102
99% KM (Chebyshev) UCL	0.151

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

***** Instead of UCL, EPC is selected to be median = <0.000126**
[per recommendation in ProUCL User Guide]

2-Butanone

Total Number of Data	20
Number of Non-Detect Data	9
Number of Detected Data	**11**
Minimum Detected	0.0017
Maximum Detected	0.208
Percent Non-Detects	**45.00%**
Minimum Non-detect	2.52E-04
Maximum Non-detect	0.016

Mean of Detected Data	0.0222
Median of Detected Data	0.00299
Variance of Detected Data	0.0038
SD of Detected Data	0.0617
CV of Detected Data	2.78
Skewness of Detected Data	3.312
Mean of Detected log data	-5.351
SD of Detected Log data	1.327

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	1
Single DL Percent Detection	95.00%

Data Dsitribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0132
SD	0.0447
Standard Error of Mean	0.0105
95% KM (t) UCL	0.0314
95% KM (z) UCL	0.0305
95% KM (BCA) UCL	0.0341
95% KM (Percentile Bootstrap) UCL	0.0337
95% KM (Chebyshev) UCL	0.0589
97.5% KM (Chebyshev) UCL	0.0787
99% KM (Chebyshev) UCL	0.118

Potential UCL to Use	
97.5% KM (Chebyshev) UCL	**0.0787**

2-Methylnaphthalene

Total Number of Data	37
Number of Non-Detect Data	32
Number of Detected Data	**5**
Minimum Detected	0.01
Maximum Detected	1.04
Percent Non-Detects	**86.49%**
Minimum Non-detect	0.01
Maximum Non-detect	0.0634

Mean of Detected Data	0.24
Median of Detected Data	0.053
Variance of Detected Data	0.2
SD of Detected Data	0.447
CV of Detected Data	1.862
Skewness of Detected Data	2.227
Mean of Detected log data	-2.706
SD of Detected Log data	1.688

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	1
Single DL Percent Detection	97.30%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0412
SD	0.167
Standard Error of Mean	0.0307
95% KM (t) UCL	0.093
95% KM (z) UCL	0.0917
95% KM (BCA) UCL	0.154
95% KM (Percentile Bootstrap) UCL	0.125
95% KM (Chebyshev) UCL	0.175
97.5% KM (Chebyshev) UCL	0.233
99% KM (Chebyshev) UCL	0.346

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

***** Instead of UCL, EPC is selected to be median = <0.0118**
[per recommendation in ProUCL User Guide]

4,4'-DDE

Total Number of Data	37
Number of Non-Detect Data	35
Number of Detected Data	**2**
Minimum Detected	0.00216
Maximum Detected	0.0149
Percent Non-Detects	**94.59%**
Minimum Non-detect	3.79E-04
Maximum Non-detect	0.054

Mean of Detected Data	0.00853
Median of Detected Data	0.00853
Variance of Detected Data	8.12E-05
SD of Detected Data	0.00901
CV of Detected Data	1.056
Skewness of Detected Data	N/A
Mean of Detected log data	-5.172
SD of Detected Log data	1.366

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00251
SD	0.00209
Standard Error of Mean	4.93E-04
95% KM (t) UCL	0.00335
95% KM (z) UCL	0.00333
95% KM (BCA) UCL	0.0149
95% KM (Percentile Bootstrap) UCL	0.0149
95% KM (Chebyshev) UCL	0.00466
97.5% KM (Chebyshev) UCL	0.0056
99% KM (Chebyshev) UCL	0.00742
Potential UCL to Use	
95% KM (BCA) UCL	0.0149

***** Instead of UCL, EPC is selected to be median = <0.000427**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	37
Number of Non-Detect Data	29
Number of Detected Data	**8**
Minimum Detected	0.000597
Maximum Detected	0.395
Percent Non-Detects	**78.38%**
Minimum Non-detect	1.46E-04
Maximum Non-detect	0.00282
Mean of Detected Data	0.0519
Median of Detected Data	0.00134
Variance of Detected Data	0.0192
SD of Detected Data	0.139
CV of Detected Data	2.671
Skewness of Detected Data	2.825
Mean of Detected log data	-5.696
SD of Detected Log data	2.15

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	34
Number treated as Detected	3
Single DL Percent Detection	91.89%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0117
SD	0.0639
Standard Error of Mean	0.0112
95% KM (t) UCL	0.0307
95% KM (z) UCL	0.0302
95% KM (BCA) UCL	0.0335
95% KM (Percentile Bootstrap) UCL	0.0331
95% KM (Chebyshev) UCL	0.0607
97.5% KM (Chebyshev) UCL	0.0818
99% KM (Chebyshev) UCL	0.123

Potential UCL to Use	
99% KM (Chebyshev) UCL	**0.123**

Acenaphthene

Total Number of Data	37
Number of Non-Detect Data	33
Number of Detected Data	**4**
Minimum Detected	0.021
Maximum Detected	0.157
Percent Non-Detects	**89.19%**
Minimum Non-detect	0.00998
Maximum Non-detect	0.125

Mean of Detected Data	0.0778
Median of Detected Data	0.0665
Variance of Detected Data	0.00429
SD of Detected Data	0.0655
CV of Detected Data	0.843
Skewness of Detected Data	0.49
Mean of Detected log data	-2.893
SD of Detected Log data	0.994

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	36
Number treated as Detected	1
Single DL Percent Detection	97.30%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0272
SD	0.0258
Standard Error of Mean	0.00491
95% KM (t) UCL	0.0355
95% KM (z) UCL	0.0353
95% KM (BCA) UCL	0.157
95% KM (Percentile Bootstrap) UCL	0.11
95% KM (Chebyshev) UCL	0.0486
97.5% KM (Chebyshev) UCL	0.0579
99% KM (Chebyshev) UCL	0.0761

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Acenaphthylene

Total Number of Data	37

Data set has all detected values equal to = 0.0555, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0555

***** Instead of UCL, EPC is selected to be median = <0.0120**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	37
Number of Distinct Observations	32
Minimum	1810
Maximum	18300
Mean	12023

Median	11700
SD	3936
Variance	15492728
Coefficient of Variation	0.327
Skewness	-0.29
Mean of log data	9.323
SD of log data	0.432
95% Useful UCLs	
Student's-t UCL	**13116**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	13055
95% Modified-t UCL	13111
Non-Parametric UCLs	
95% CLT UCL	13088
95% Jackknife UCL	13116
95% Standard Bootstrap UCL	13081
95% Bootstrap-t UCL	13073
95% Hall's Bootstrap UCL	13031
95% Percentile Bootstrap UCL	13070
95% BCA Bootstrap UCL	13022
95% Chebyshev(Mean, Sd) UCL	14844
97.5% Chebyshev(Mean, Sd) UCL	16064
99% Chebyshev(Mean, Sd) UCL	18462

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	37
Number of Non-Detect Data	30
Number of Detected Data	**7**
Minimum Detected	0.00887
Maximum Detected	0.264
Percent Non-Detects	**81.08%**
Minimum Non-detect	0.00744
Maximum Non-detect	0.0641
Mean of Detected Data	0.11
Median of Detected Data	0.051
Variance of Detected Data	0.00988
SD of Detected Data	0.0994
CV of Detected Data	0.903
Skewness of Detected Data	0.593
Mean of Detected log data	-2.71
SD of Detected Log data	1.214

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	34
Number treated as Detected	3
Single DL Percent Detection	91.89%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0281
SD	0.0563
Standard Error of Mean	0.01
95% KM (t) UCL	0.045
95% KM (z) UCL	0.0446
95% KM (BCA) UCL	0.0754
95% KM (Percentile Bootstrap) UCL	0.0669
95% KM (Chebyshev) UCL	0.0717
97.5% KM (Chebyshev) UCL	0.0906
99% KM (Chebyshev) UCL	0.128

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.0120**
[per recommendation in ProUCL User Guide]

Antimony

Total Number of Data	37
Number of Non-Detect Data	20
Number of Detected Data	**17**
Minimum Detected	0.36
Maximum Detected	8.09
Percent Non-Detects	**54.05%**
Minimum Non-detect	0.19
Maximum Non-detect	0.26

Mean of Detected Data	2.886
Median of Detected Data	2.56
Variance of Detected Data	2.571
SD of Detected Data	1.604
CV of Detected Data	0.556
Skewness of Detected Data	2.178
Mean of Detected log data	0.915
SD of Detected Log data	0.615

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	1.521
SD	1.642
Standard Error of Mean	0.278
95% KM (t) UCL	1.991
95% KM (z) UCL	1.979
95% KM (BCA) UCL	2.745
95% KM (Percentile Bootstrap) UCL	2.633
95% KM (Chebyshev) UCL	2.734
97.5% KM (Chebyshev) UCL	3.259
99% KM (Chebyshev) UCL	4.29

Potential UCL to Use	
95% KM (t) UCL	1.991
95% KM (% Bootstrap) UCL	**2.633**

Aroclor-1254

Total Number of Data	37
Number of Non-Detect Data	34
Number of Detected Data	**3**
Minimum Detected	0.0122
Maximum Detected	6.35
Percent Non-Detects	**91.89%**
Minimum Non-detect	0.00379
Maximum Non-detect	0.031

Mean of Detected Data	2.152
Median of Detected Data	0.0938
Variance of Detected Data	13.22
SD of Detected Data	3.636
CV of Detected Data	1.689
Skewness of Detected Data	1.731
Mean of Detected log data	-1.641
SD of Detected Log data	3.19

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	2
Single DL Percent Detection	94.59%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.186
SD	1.027
Standard Error of Mean	0.207
95% KM (t) UCL	0.535
95% KM (z) UCL	0.526
95% KM (BCA) UCL	6.35
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	1.087
97.5% KM (Chebyshev) UCL	1.478
99% KM (Chebyshev) UCL	2.244

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

***** Instead of UCL, EPC is selected to be median = <0.00430**
[per recommendation in ProUCL User Guide]

Arsenic

Total Number of Data	37
Number of Non-Detect Data	5
Number of Detected Data	**32**
Minimum Detected	0.54
Maximum Detected	5.69
Percent Non-Detects	**13.51%**
Minimum Non-detect	0.15
Maximum Non-detect	0.68

Mean of Detected Data	2.869
Median of Detected Data	2.575
Variance of Detected Data	1.3
SD of Detected Data	1.14
CV of Detected Data	0.397
Skewness of Detected Data	0.892
Mean of Detected log data	0.972
SD of Detected Log data	0.438

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	6
Number treated as Detected	31
Single DL Percent Detection	16.22%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	16.22%
Mean	2.507
SD	0.754
95% Winsor (t) UCL	2.719

Kaplan Meier (KM) Method	
Mean	2.554
SD	1.313
Standard Error of Mean	0.219
95% KM (t) UCL	2.925
95% KM (z) UCL	2.915
95% KM (BCA) UCL	3.075
95% KM (Percentile Bootstrap) UCL	2.971
95% KM (Chebyshev) UCL	3.51
97.5% KM (Chebyshev) UCL	3.924
99% KM (Chebyshev) UCL	4.736

Potential UCL to Use
95% KM (Chebyshev) UCL **3.51**

Barium

Number of Valid Observations	37
Number of Distinct Observations	32
Minimum	46.1
Maximum	476
Mean	140.1
Median	119
SD	95.35
Variance	9091
Coefficient of Variation	0.681
Skewness	2.336
Mean of log data	4.786
SD of log data	0.531

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	166.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	172.3
95% Modified-t UCL	167.5
Non-Parametric UCLs	
95% CLT UCL	165.8

95% Jackknife UCL	166.5
95% Standard Bootstrap UCL	165.5
95% Bootstrap-t UCL	176.9
95% Hall's Bootstrap UCL	182.7
95% Percentile Bootstrap UCL	165.7
95% BCA Bootstrap UCL	171.6
95% Chebyshev(Mean, Sd) UCL	208.4
97.5% Chebyshev(Mean, Sd) UCL	237.9
99% Chebyshev(Mean, Sd) UCL	296

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **208.4**

Benzene

Total Number of Data	20
Number of Non-Detect Data	8
Number of Detected Data	**12**
Minimum Detected	0.00138
Maximum Detected	0.00632
Percent Non-Detects	**40.00%**
Minimum Non-detect	9.00E-05
Maximum Non-detect	0.00531

Mean of Detected Data	0.00357
Median of Detected Data	0.00299
Variance of Detected Data	2.98E-06
SD of Detected Data	0.00173
CV of Detected Data	0.484
Skewness of Detected Data	0.473
Mean of Detected log data	-5.752
SD of Detected Log data	0.517

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	17
Number treated as Detected	3
Single DL Percent Detection	85.00%

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.00292
SD	0.0016
Standard Error of Mean	3.95E-04
95% KM (t) UCL	0.0036
95% KM (z) UCL	0.00357
95% KM (BCA) UCL	0.00368
95% KM (Percentile Bootstrap) UCL	0.00362

95% KM (Chebyshev) UCL	0.00464
97.5% KM (Chebyshev) UCL	**0.00539**
99% KM (Chebyshev) UCL	0.00685

Data appear Normal (0.05)
May want to try Normal UCLs

Benzo(a)anthracene

Total Number of Data	37
Number of Non-Detect Data	32
Number of Detected Data	**5**
Minimum Detected	0.0383
Maximum Detected	1.18
Percent Non-Detects	**86.49%**
Minimum Non-detect	0.00503
Maximum Non-detect	0.0596

Mean of Detected Data	0.576
Median of Detected Data	0.611
Variance of Detected Data	0.219
SD of Detected Data	0.468
CV of Detected Data	0.813
Skewness of Detected Data	0.128
Mean of Detected log data	-1.075
SD of Detected Log data	1.398

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	33
Number treated as Detected	4
Single DL Percent Detection	89.19%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.111
SD	0.24
Standard Error of Mean	0.0441
95% KM (t) UCL	0.185
95% KM (z) UCL	0.183
95% KM (BCA) UCL	0.864
95% KM (Percentile Bootstrap) UCL	0.662
95% KM (Chebyshev) UCL	0.303

97.5% KM (Chebyshev) UCL	0.386
99% KM (Chebyshev) UCL	0.55

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median =** **<0.0111**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	37
Number of Non-Detect Data	27
Number of Detected Data	**10**
Minimum Detected	0.0135
Maximum Detected	1.42
Percent Non-Detects	**72.97%**
Minimum Non-detect	0.00901
Maximum Non-detect	0.1
Mean of Detected Data	0.318
Median of Detected Data	0.107
Variance of Detected Data	0.223
SD of Detected Data	0.472
CV of Detected Data	1.484
Skewness of Detected Data	1.951
Mean of Detected log data	-2.019
SD of Detected Log data	1.398

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	30
Number treated as Detected	7
Single DL Percent Detection	81.08%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0959
SD	0.269
Standard Error of Mean	0.0466
95% KM (t) UCL	0.175
95% KM (z) UCL	0.173
95% KM (BCA) UCL	0.219
95% KM (Percentile Bootstrap) UCL	0.19
95% KM (Chebyshev) UCL	0.299
97.5% KM (Chebyshev) UCL	**0.387**
99% KM (Chebyshev) UCL	0.56

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(b)fluoranthene

Total Number of Data	37
Number of Non-Detect Data	25
Number of Detected Data	**12**
Minimum Detected	0.0487
Maximum Detected	1.62
Percent Non-Detects	**67.57%**
Minimum Non-detect	0.00721
Maximum Non-detect	0.137

Mean of Detected Data	0.349
Median of Detected Data	0.148
Variance of Detected Data	0.237
SD of Detected Data	0.487
CV of Detected Data	1.397
Skewness of Detected Data	2.223
Mean of Detected log data	-1.63
SD of Detected Log data	1

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	30
Number treated as Detected	7
Single DL Percent Detection	81.08%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.146
SD	0.3
Standard Error of Mean	0.0516
95% KM (t) UCL	0.233
95% KM (z) UCL	0.231
95% KM (BCA) UCL	0.289
95% KM (Percentile Bootstrap) UCL	0.26
95% KM (Chebyshev) UCL	0.371
97.5% KM (Chebyshev) UCL	0.468
99% KM (Chebyshev) UCL	0.66

Potential UCL to Use

95% KM (t) UCL	0.233
95% KM (% Bootstrap) UCL	**0.26**

Benzo(g,h,i)perylene

Total Number of Data	37
Number of Non-Detect Data	23
Number of Detected Data	**14**
Minimum Detected	0.0237
Maximum Detected	1.28
Percent Non-Detects	**62.16%**
Minimum Non-detect	0.00933
Maximum Non-detect	0.101
Mean of Detected Data	0.239
Median of Detected Data	0.0895
Variance of Detected Data	0.119
SD of Detected Data	0.345
CV of Detected Data	1.448
Skewness of Detected Data	2.504
Mean of Detected log data	-2.129
SD of Detected Log data	1.17

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	32
Number treated as Detected	5
Single DL Percent Detection	86.49%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.105
SD	0.23
Standard Error of Mean	0.0392
95% KM (t) UCL	0.171
95% KM (z) UCL	0.17
95% KM (BCA) UCL	0.193
95% KM (Percentile Bootstrap) UCL	0.181
95% KM (Chebyshev) UCL	0.276
97.5% KM (Chebyshev) UCL	**0.35**
99% KM (Chebyshev) UCL	0.495

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Benzo(k)fluoranthene

Total Number of Data	37
Number of Non-Detect Data	31
Number of Detected Data	**6**
Minimum Detected	0.068
Maximum Detected	0.799

Percent Non-Detects	**83.78%**
Minimum Non-detect	0.011
Maximum Non-detect	0.124

Mean of Detected Data	0.314
Median of Detected Data	0.137
Variance of Detected Data	0.108
SD of Detected Data	0.328
CV of Detected Data	1.043
Skewness of Detected Data	1.006
Mean of Detected log data	-1.639
SD of Detected Log data	1.066

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	33
Number treated as Detected	4
Single DL Percent Detection	89.19%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.108
SD	0.151
Standard Error of Mean	0.0272
95% KM (t) UCL	0.154
95% KM (z) UCL	0.153
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.182
95% KM (Chebyshev) UCL	0.226
97.5% KM (Chebyshev) UCL	0.278
99% KM (Chebyshev) UCL	0.378

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

***** Instead of UCL, EPC is selected to be median = <0.0172**
[per recommendation in ProUCL User Guide]

Beryllium

Total Number of Data	37
Number of Non-Detect Data	1
Number of Detected Data	**36**

Minimum Detected	0.066
Maximum Detected	2.88
Percent Non-Detects	**2.70%**
Minimum Non-detect	0.026
Maximum Non-detect	0.026
Mean of Detected Data	0.758
Median of Detected Data	0.695
Variance of Detected Data	0.205
SD of Detected Data	0.452
CV of Detected Data	0.596
Skewness of Detected Data	2.974
Mean of Detected log data	-0.43
SD of Detected Log data	0.613

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	0.613
Mean	0.697
SD	0.303
95% Winsor (t) UCL	0.782
Kaplan Meier (KM) Method	
Mean	0.74
SD	0.454
Standard Error of Mean	0.0757
95% KM (t) UCL	0.867
95% KM (z) UCL	0.864
95% KM (BCA) UCL	0.874
95% KM (Percentile Bootstrap) UCL	0.873
95% KM (Chebyshev) UCL	1.069
97.5% KM (Chebyshev) UCL	1.212
99% KM (Chebyshev) UCL	1.493
Potential UCL to Use	
95% KM (Chebyshev) UCL	**1.069**

Bis(2-Ethylhexyl)phthalate

Total Number of Data	37
Number of Non-Detect Data	26
Number of Detected Data	**11**
Minimum Detected	0.0122
Maximum Detected	0.239
Percent Non-Detects	**70.27%**
Minimum Non-detect	0.013
Maximum Non-detect	0.54
Mean of Detected Data	0.0755
Median of Detected Data	0.0532
Variance of Detected Data	0.00496
SD of Detected Data	0.0704

CV of Detected Data	0.933
Skewness of Detected Data	1.513
Mean of Detected log data	-2.961
SD of Detected Log data	0.926

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	0
Single DL Percent Detection	100.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0389
SD	0.0458
Standard Error of Mean	0.00865
95% KM (t) UCL	0.0535
95% KM (z) UCL	0.0531
95% KM (BCA) UCL	0.0588
95% KM (Percentile Bootstrap) UCL	0.0571
95% KM (Chebyshev) UCL	0.0766
97.5% KM (Chebyshev) UCL	**0.0929**
99% KM (Chebyshev) UCL	0.125

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Boron

Total Number of Data	37
Number of Non-Detect Data	10
Number of Detected Data	**27**
Minimum Detected	3.14
Maximum Detected	39.2
Percent Non-Detects	**27.03%**
Minimum Non-detect	1.11
Maximum Non-detect	1.3

Mean of Detected Data	10.46
Median of Detected Data	9
Variance of Detected Data	57.51
SD of Detected Data	7.584
CV of Detected Data	0.725
Skewness of Detected Data	2.164
Mean of Detected log data	2.141
SD of Detected Log data	0.645

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	0.645
Mean	6.557
SD	3.296
95% Winsor (t) UCL	7.503

Kaplan Meier (KM) Method	
Mean	8.482
SD	7.14
Standard Error of Mean	1.196
95% KM (t) UCL	10.5
95% KM (z) UCL	10.45
95% KM (BCA) UCL	10.72
95% KM (Percentile Bootstrap) UCL	10.64
95% KM (Chebyshev) UCL	13.7
97.5% KM (Chebyshev) UCL	**15.95**
99% KM (Chebyshev) UCL	20.38

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Bromoform

Total Number of Data	20
Number of Non-Detect Data	18
Number of Detected Data	**2**
Minimum Detected	0.011
Maximum Detected	0.018
Percent Non-Detects	**90.00%**
Minimum Non-detect	1.37E-04
Maximum Non-detect	0.00863

Mean of Detected Data	0.0145
Median of Detected Data	0.0145
Variance of Detected Data	2.45E-05
SD of Detected Data	0.00495
CV of Detected Data	0.341
Skewness of Detected Data	N/A
Mean of Detected log data	-4.264
SD of Detected Log data	0.348

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0114
SD	0.00153
Standard Error of Mean	4.82E-04
95% KM (t) UCL	0.0122
95% KM (z) UCL	0.0121
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0135
97.5% KM (Chebyshev) UCL	0.0144
99% KM (Chebyshev) UCL	0.0162
Potential UCL to Use	
95% KM (t) UCL	0.0122
95% KM (% Bootstrap) UCL	N/A

***** Instead of UCL, EPC is selected to be median = <0.000186**
[per recommendation in ProUCL User Guide]

Butyl benzyl phthalate

Total Number of Data	37
Number of Non-Detect Data	35
Number of Detected Data	**2**
Minimum Detected	0.054
Maximum Detected	0.151
Percent Non-Detects	**94.59%**
Minimum Non-detect	0.00913
Maximum Non-detect	0.107
Mean of Detected Data	0.103
Median of Detected Data	0.103
Variance of Detected Data	0.0047
SD of Detected Data	0.0686
CV of Detected Data	0.669
Skewness of Detected Data	N/A
Mean of Detected log data	-2.405

SD of Detected Log data	0.727

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	1
Single DL Percent Detection	97.30%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0566
SD	0.0157
Standard Error of Mean	0.00366
95% KM (t) UCL	0.0628
95% KM (z) UCL	0.0626
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.151
95% KM (Chebyshev) UCL	0.0726
97.5% KM (Chebyshev) UCL	0.0795
99% KM (Chebyshev) UCL	0.093

Potential UCL to Use	
95% KM (t) UCL	0.0628
95% KM (% Bootstrap) UCL	0.151

***** Instead of UCL, EPC is selected to be median = <0.0136**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data	37
Number of Non-Detect Data	22
Number of Detected Data	**15**
Minimum Detected	0.28

Maximum Detected	0.8
Percent Non-Detects	**59.46%**
Minimum Non-detect	0.006
Maximum Non-detect	0.033

Mean of Detected Data	0.452
Median of Detected Data	0.42
Variance of Detected Data	0.0197
SD of Detected Data	0.141
CV of Detected Data	0.311
Skewness of Detected Data	1.241
Mean of Detected log data	-0.834
SD of Detected Log data	0.288

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.35
SD	0.121
Standard Error of Mean	0.0206
95% KM (t) UCL	0.384
95% KM (z) UCL	0.384
95% KM (BCA) UCL	0.426
95% KM (Percentile Bootstrap) UCL	0.406
95% KM (Chebyshev) UCL	0.439
97.5% KM (Chebyshev) UCL	**0.478**
99% KM (Chebyshev) UCL	0.554

Data appear Normal (0.05)
May want to try Normal UCLs

Carbazole

Total Number of Data	37
Number of Non-Detect Data	30
Number of Detected Data	**7**
Minimum Detected	0.0108
Maximum Detected	0.128
Percent Non-Detects	**81.08%**
Minimum Non-detect	0.00965
Maximum Non-detect	0.108

Mean of Detected Data	0.0465
Median of Detected Data	0.019
Variance of Detected Data	0.0025
SD of Detected Data	0.05

CV of Detected Data	1.075
Skewness of Detected Data	1.231
Mean of Detected log data	-3.532
SD of Detected Log data	1.001

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	2
Single DL Percent Detection	94.59%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0176
SD	0.0245
Standard Error of Mean	0.00436
95% KM (t) UCL	0.025
95% KM (z) UCL	0.0248
95% KM (BCA) UCL	0.031
95% KM (Percentile Bootstrap) UCL	0.0275
95% KM (Chebyshev) UCL	0.0366
97.5% KM (Chebyshev) UCL	0.0448
99% KM (Chebyshev) UCL	0.061

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

***** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Carbon disulfide

Total Number of Data	20
Number of Non-Detect Data	17
Number of Detected Data	**3**
Minimum Detected	0.00757
Maximum Detected	0.0284
Percent Non-Detects	**85.00%**
Minimum Non-detect	8.80E-05
Maximum Non-detect	0.00556
Mean of Detected Data	0.0147
Median of Detected Data	0.00811

Variance of Detected Data	1.41E-04
SD of Detected Data	0.0119
CV of Detected Data	0.808
Skewness of Detected Data	1.728
Mean of Detected log data	-4.42
SD of Detected Log data	0.744

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00864
SD	0.00454
Standard Error of Mean	0.00124
95% KM (t) UCL	0.0108
95% KM (z) UCL	0.0107
95% KM (BCA) UCL	0.0284
95% KM (Percentile Bootstrap) UCL	0.0284
95% KM (Chebyshev) UCL	0.0141
97.5% KM (Chebyshev) UCL	0.0164
99% KM (Chebyshev) UCL	0.021

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.000118**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	37
Number of Distinct Observations	34
Minimum	7.76
Maximum	128
Mean	17.32
Median	12.9
SD	19.35
Variance	374.4

Coefficient of Variation	1.117
Skewness	5.481
Mean of log data	2.664
SD of log data	0.489

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	22.69
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	25.62
95% Modified-t UCL	23.17
Non-Parametric UCLs	
95% CLT UCL	22.55
95% Jackknife UCL	22.69
95% Standard Bootstrap UCL	22.37
95% Bootstrap-t UCL	35.17
95% Hall's Bootstrap UCL	42.86
95% Percentile Bootstrap UCL	23.36
95% BCA Bootstrap UCL	27.12
95% Chebyshev(Mean, Sd) UCL	31.19
97.5% Chebyshev(Mean, Sd) UCL	37.19
99% Chebyshev(Mean, Sd) UCL	48.97

Potential UCL to Use	
Use 95% Student's-t UCL	22.69
Or 95% Modified-t UCL	**23.17**

Chrysene

Total Number of Data	37
Number of Non-Detect Data	25
Number of Detected Data	**12**
Minimum Detected	0.0104
Maximum Detected	1.3
Percent Non-Detects	**67.57%**
Minimum Non-detect	0.00816
Maximum Non-detect	0.0523
Mean of Detected Data	0.302
Median of Detected Data	0.122
Variance of Detected Data	0.181
SD of Detected Data	0.425
CV of Detected Data	1.408
Skewness of Detected Data	1.711
Mean of Detected log data	-2.204
SD of Detected Log data	1.606

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	28
Number treated as Detected	9
Single DL Percent Detection	75.68%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.105
SD	0.269
Standard Error of Mean	0.0462
95% KM (t) UCL	0.183
95% KM (z) UCL	0.181
95% KM (BCA) UCL	0.211
95% KM (Percentile Bootstrap) UCL	0.193
95% KM (Chebyshev) UCL	0.307
97.5% KM (Chebyshev) UCL	**0.394**
99% KM (Chebyshev) UCL	0.565

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

cis-1,2-Dichloroethene

Total Number of Data	20
Number of Non-Detect Data	18
Number of Detected Data	**2**
Minimum Detected	0.0195
Maximum Detected	0.999
Percent Non-Detects	**90.00%**
Minimum Non-detect	1.02E-04
Maximum Non-detect	0.00643

Mean of Detected Data	0.509
Median of Detected Data	0.509
Variance of Detected Data	0.48
SD of Detected Data	0.693
CV of Detected Data	1.36
Skewness of Detected Data	N/A
Mean of Detected log data	-1.969
SD of Detected Log data	2.783

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0685
SD	0.213
Standard Error of Mean	0.0675
95% KM (t) UCL	0.185
95% KM (z) UCL	0.18
95% KM (BCA) UCL	0.999
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.363
97.5% KM (Chebyshev) UCL	0.49
99% KM (Chebyshev) UCL	0.74
Potential UCL to Use	
99% KM (Chebyshev) UCL	0.74

***** Instead of UCL, EPC is selected to be median = <0.000136**
[per recommendation in ProUCL User Guide]

Cobalt

Number of Valid Observations	37
Number of Distinct Observations	37
Minimum	2.81
Maximum	10.3
Mean	6.31
Median	6.09
SD	1.719
Variance	2.956
Coefficient of Variation	0.272
Skewness	0.117
Mean of log data	1.802
SD of log data	0.295
95% Useful UCLs	
Student's-t UCL	**6.787**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	6.781
95% Modified-t UCL	6.788

Non-Parametric UCLs	
95% CLT UCL	6.775
95% Jackknife UCL	6.787
95% Standard Bootstrap UCL	6.771
95% Bootstrap-t UCL	6.79
95% Hall's Bootstrap UCL	6.804
95% Percentile Bootstrap UCL	6.764
95% BCA Bootstrap UCL	6.746
95% Chebyshev(Mean, Sd) UCL	7.542
97.5% Chebyshev(Mean, Sd) UCL	8.075
99% Chebyshev(Mean, Sd) UCL	9.122

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	37
Number of Distinct Observations	35
Minimum	4.59
Maximum	200
Mean	20.69
Median	10.2
SD	33.7
Variance	1135
Coefficient of Variation	1.629
Skewness	4.676
Mean of log data	2.606
SD of log data	0.753

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	30.04
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	34.35
95% Modified-t UCL	30.75
Non-Parametric UCLs	
95% CLT UCL	29.8
95% Jackknife UCL	30.04
95% Standard Bootstrap UCL	29.82
95% Bootstrap-t UCL	56.19
95% Hall's Bootstrap UCL	71.27
95% Percentile Bootstrap UCL	30.43
95% BCA Bootstrap UCL	35.99
95% Chebyshev(Mean, Sd) UCL	44.84
97.5% Chebyshev(Mean, Sd) UCL	55.29
99% Chebyshev(Mean, Sd) UCL	75.81

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	**44.84**

Cyclohexane

Total Number of Data	20
Number of Non-Detect Data	15
Number of Detected Data	**5**
Minimum Detected	0.000981
Maximum Detected	0.00185
Percent Non-Detects	**75.00%**
Minimum Non-detect	9.62E-04
Maximum Non-detect	0.056

Mean of Detected Data	0.00141
Median of Detected Data	0.00145
Variance of Detected Data	1.05E-07
SD of Detected Data	3.25E-04
CV of Detected Data	0.23
Skewness of Detected Data	-0.0112
Mean of Detected log data	-6.583
SD of Detected Log data	0.238

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	20
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.00113
SD	2.64E-04
Standard Error of Mean	7.65E-05
95% KM (t) UCL	0.00126
95% KM (z) UCL	0.00125
95% KM (BCA) UCL	0.00156
95% KM (Percentile Bootstrap) UCL	0.0015
95% KM (Chebyshev) UCL	0.00146
97.5% KM (Chebyshev) UCL	0.0016
99% KM (Chebyshev) UCL	0.00189

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.00124**
[per recommendation in ProUCL User Guide]

Dibenz(a,h)anthracene

Total Number of Data	37
Number of Non-Detect Data	30
Number of Detected Data	**7**
Minimum Detected	0.045
Maximum Detected	0.404
Percent Non-Detects	**81.08%**
Minimum Non-detect	0.00687
Maximum Non-detect	0.077

Mean of Detected Data	0.174
Median of Detected Data	0.166
Variance of Detected Data	0.0138
SD of Detected Data	0.117
CV of Detected Data	0.676
Skewness of Detected Data	1.29
Mean of Detected log data	-1.955
SD of Detected Log data	0.723

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	32
Number treated as Detected	5
Single DL Percent Detection	86.49%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0694
SD	0.0692
Standard Error of Mean	0.0123
95% KM (t) UCL	0.0901
95% KM (z) UCL	0.0896
95% KM (BCA) UCL	0.181
95% KM (Percentile Bootstrap) UCL	0.168
95% KM (Chebyshev) UCL	0.123
97.5% KM (Chebyshev) UCL	0.146
99% KM (Chebyshev) UCL	0.192

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.0109**
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	37
Number of Non-Detect Data	34
Number of Detected Data	**3**
Minimum Detected	0.015
Maximum Detected	0.291
Percent Non-Detects	**91.89%**
Minimum Non-detect	0.00606
Maximum Non-detect	0.083
Mean of Detected Data	0.131
Median of Detected Data	0.0862
Variance of Detected Data	0.0205
SD of Detected Data	0.143
CV of Detected Data	1.096
Skewness of Detected Data	1.263
Mean of Detected log data	-2.628
SD of Detected Log data	1.491

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	2
Single DL Percent Detection	94.59%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0244
SD	0.0459
Standard Error of Mean	0.00924
95% KM (t) UCL	0.04
95% KM (z) UCL	0.0396

95% KM (BCA) UCL	0.291
95% KM (Percentile Bootstrap) UCL	0.291
95% KM (Chebyshev) UCL	0.0647
97.5% KM (Chebyshev) UCL	0.0821
99% KM (Chebyshev) UCL	0.116

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.0150**
[per recommendation in ProUCL User Guide]

Dieldrin

Total Number of Data	37

Data set has all detected values equal to = 0.00545, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00545

***** Instead of UCL, EPC is selected to be median = <0.000184**
[per recommendation in ProUCL User Guide]

Diethyl phthalate

Total Number of Data	37
Number of Non-Detect Data	35
Number of Detected Data	**2**
Minimum Detected	0.00992
Maximum Detected	0.011
Percent Non-Detects	**94.59%**
Minimum Non-detect	0.00756
Maximum Non-detect	0.0996

Mean of Detected Data	0.0105
Median of Detected Data	0.0105
Variance of Detected Data	5.83E-07
SD of Detected Data	7.64E-04
CV of Detected Data	0.073
Skewness of Detected Data	N/A
Mean of Detected log data	-4.562
SD of Detected Log data	0.0731

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0101
SD	3.57E-04
Standard Error of Mean	1.79E-04
95% KM (t) UCL	0.0104
95% KM (z) UCL	0.0103
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0108
97.5% KM (Chebyshev) UCL	0.0112
99% KM (Chebyshev) UCL	0.0118
Potential UCL to Use	
95% KM (t) UCL	0.0104
95% KM (% Bootstrap) UCL	N/A

***** Instead of UCL, EPC is selected to be median = <0.0184**
[per recommendation in ProUCL User Guide]

Di-n-butyl phthalate

Total Number of Data	37
Number of Non-Detect Data	35
Number of Detected Data	**2**
Minimum Detected	0.01
Maximum Detected	0.015
Percent Non-Detects	**94.59%**
Minimum Non-detect	0.00797
Maximum Non-detect	0.167
Mean of Detected Data	0.0125
Median of Detected Data	0.0125
Variance of Detected Data	1.25E-05
SD of Detected Data	0.00354
CV of Detected Data	0.283

Skewness of Detected Data	N/A
Mean of Detected log data	-4.402
SD of Detected Log data	0.287

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0106
SD	0.00157
Standard Error of Mean	7.41E-04
95% KM (t) UCL	0.0118
95% KM (z) UCL	0.0118
95% KM (BCA) UCL	0.015
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0138
97.5% KM (Chebyshev) UCL	0.0152
99% KM (Chebyshev) UCL	0.0179

Potential UCL to Use

95% KM (t) UCL	0.0118
95% KM (% Bootstrap) UCL	N/A

***** Instead of UCL, EPC is selected to be median = <0.0309**
[per recommendation in ProUCL User Guide]

Di-n-octyl phthalate

Total Number of Data	37
Number of Non-Detect Data	34

Number of Detected Data	**3**
Minimum Detected	0.0154
Maximum Detected	0.123
Percent Non-Detects	**91.89%**
Minimum Non-detect	0.00834
Maximum Non-detect	0.254
Mean of Detected Data	0.0601
Median of Detected Data	0.042
Variance of Detected Data	0.00314
SD of Detected Data	0.056
CV of Detected Data	0.932
Skewness of Detected Data	1.304
Mean of Detected log data	-3.146
SD of Detected Log data	1.039

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	37
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0191
SD	0.0181
Standard Error of Mean	0.0037
95% KM (t) UCL	0.0254
95% KM (z) UCL	0.0252
95% KM (BCA) UCL	0.123
95% KM (Percentile Bootstrap) UCL	0.123
95% KM (Chebyshev) UCL	0.0353
97.5% KM (Chebyshev) UCL	0.0422
99% KM (Chebyshev) UCL	0.056

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.00951**
[per recommendation in ProUCL User Guide]

Endrin

Total Number of Data	37

Data set has all detected values equal to = 0.00149, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00149

***** Instead of UCL, EPC is selected to be median = <0.000223**
[per recommendation in ProUCL User Guide]

Endrin ketone

Total Number of Data	37

Data set has all detected values equal to = 0.00966, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00966

***** Instead of UCL, EPC is selected to be median = <0.000551**
[per recommendation in ProUCL User Guide]

Ethylbenzene

Total Number of Data	20
Number of Non-Detect Data	14
Number of Detected Data	**6**
Minimum Detected	0.00114
Maximum Detected	0.023
Percent Non-Detects	**70.00%**
Minimum Non-detect	1.74E-04
Maximum Non-detect	0.00954
Mean of Detected Data	0.00598
Median of Detected Data	0.00244
Variance of Detected Data	7.13E-05
SD of Detected Data	0.00844
CV of Detected Data	1.413
Skewness of Detected Data	2.323
Mean of Detected log data	-5.697
SD of Detected Log data	1.059

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	1
Single DL Percent Detection	95.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00269
SD	0.00476
Standard Error of Mean	0.00117
95% KM (t) UCL	0.00472
95% KM (z) UCL	0.00462
95% KM (BCA) UCL	0.00575
95% KM (Percentile Bootstrap) UCL	0.0051
95% KM (Chebyshev) UCL	0.0078
97.5% KM (Chebyshev) UCL	0.01
99% KM (Chebyshev) UCL	0.0144

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

***** Instead of UCL, EPC is selected to be median = <0.000684**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	37
Number of Non-Detect Data	28
Number of Detected Data	**9**
Minimum Detected	0.0214
Maximum Detected	2.19
Percent Non-Detects	**75.68%**
Minimum Non-detect	0.00676
Maximum Non-detect	0.075

Mean of Detected Data	0.562
Median of Detected Data	0.183
Variance of Detected Data	0.7
SD of Detected Data	0.837
CV of Detected Data	1.487
Skewness of Detected Data	1.606
Mean of Detected log data	-1.596
SD of Detected Log data	1.54

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs
Number treated as Non-Detect 31

Number treated as Detected	6
Single DL Percent Detection	83.78%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.153
SD	0.453
Standard Error of Mean	0.079
95% KM (t) UCL	0.286
95% KM (z) UCL	0.283
95% KM (BCA) UCL	0.355
95% KM (Percentile Bootstrap) UCL	0.308
95% KM (Chebyshev) UCL	0.497
97.5% KM (Chebyshev) UCL	**0.646**
99% KM (Chebyshev) UCL	0.939

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Fluorene

Total Number of Data	37
Number of Non-Detect Data	32
Number of Detected Data	**5**
Minimum Detected	0.017
Maximum Detected	1.21
Percent Non-Detects	**86.49%**
Minimum Non-detect	0.00687
Maximum Non-detect	0.0575

Mean of Detected Data	0.286
Median of Detected Data	0.036
Variance of Detected Data	0.269
SD of Detected Data	0.519
CV of Detected Data	1.815
Skewness of Detected Data	2.186
Mean of Detected log data	-2.563
SD of Detected Log data	1.731

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	2

Single DL Percent Detection	94.59%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0534
SD	0.194
Standard Error of Mean	0.0356
95% KM (t) UCL	0.114
95% KM (z) UCL	0.112
95% KM (BCA) UCL	1.21
95% KM (Percentile Bootstrap) UCL	0.14
95% KM (Chebyshev) UCL	0.209
97.5% KM (Chebyshev) UCL	0.276
99% KM (Chebyshev) UCL	0.408

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

***** Instead of UCL, EPC is selected to be median = <0.0108**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	37
Number of Non-Detect Data	24
Number of Detected Data	**13**
Minimum Detected	0.02
Maximum Detected	1.51
Percent Non-Detects	**64.86%**
Minimum Non-detect	0.014
Maximum Non-detect	0.147
Mean of Detected Data	0.295
Median of Detected Data	0.149
Variance of Detected Data	0.172
SD of Detected Data	0.414
CV of Detected Data	1.403
Skewness of Detected Data	2.569
Mean of Detected log data	-1.812
SD of Detected Log data	1.079

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	30
Number treated as Detected	7
Single DL Percent Detection	81.08%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.117
SD	0.27
Standard Error of Mean	0.0462
95% KM (t) UCL	0.195
95% KM (z) UCL	0.193
95% KM (BCA) UCL	0.257
95% KM (Percentile Bootstrap) UCL	0.218
95% KM (Chebyshev) UCL	0.319
97.5% KM (Chebyshev) UCL	**0.406**
99% KM (Chebyshev) UCL	0.577

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Iron

Number of Valid Observations	37
Number of Distinct Observations	33
Minimum	7120
Maximum	102000
Mean	17986
Median	15400
SD	15086
Variance	2.28E+08
Coefficient of Variation	0.839
Skewness	5.059
Mean of log data	9.66
SD of log data	0.45

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	22174
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	24270
95% Modified-t UCL	22517
Non-Parametric UCLs	
95% CLT UCL	22066
95% Jackknife UCL	22174
95% Standard Bootstrap UCL	21960
95% Bootstrap-t UCL	29085

95% Hall's Bootstrap UCL	39628
95% Percentile Bootstrap UCL	22821
95% BCA Bootstrap UCL	25726
95% Chebyshev(Mean, Sd) UCL	28797
97.5% Chebyshev(Mean, Sd) UCL	33474
99% Chebyshev(Mean, Sd) UCL	42663

Potential UCL to Use

Use 95% Student's-t UCL	22174
Or 95% Modified-t UCL	**22517**

Lead

Number of Valid Observations	37
Number of Distinct Observations	32
Minimum	5.88
Maximum	471
Mean	38.17
Median	16
SD	79.89
Variance	6382
Coefficient of Variation	2.093
Skewness	4.77
Mean of log data	2.959
SD of log data	0.932

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	60.34
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	70.77
95% Modified-t UCL	62.06
Non-Parametric UCLs	
95% CLT UCL	59.77
95% Jackknife UCL	60.34
95% Standard Bootstrap UCL	59.28
95% Bootstrap-t UCL	104.4
95% Hall's Bootstrap UCL	128.9
95% Percentile Bootstrap UCL	62.46
95% BCA Bootstrap UCL	75.57
95% Chebyshev(Mean, Sd) UCL	95.42
97.5% Chebyshev(Mean, Sd) UCL	120.2
99% Chebyshev(Mean, Sd) UCL	168.8

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL	**95.42**

Lithium

Number of Valid Observations	37
Number of Distinct Observations	34
Minimum	2.59
Maximum	32.2
Mean	18.87
Median	18.8
SD	5.873
Variance	34.49
Coefficient of Variation	0.311
Skewness	-2.17E-04
Mean of log data	2.873
SD of log data	0.418

95% Useful UCLs	
Student's-t UCL	**20.5**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.46
95% Modified-t UCL	20.5

Non-Parametric UCLs	
95% CLT UCL	20.46
95% Jackknife UCL	20.5
95% Standard Bootstrap UCL	20.46
95% Bootstrap-t UCL	20.48
95% Hall's Bootstrap UCL	20.48
95% Percentile Bootstrap UCL	20.46
95% BCA Bootstrap UCL	20.48
95% Chebyshev(Mean, Sd) UCL	23.08
97.5% Chebyshev(Mean, Sd) UCL	24.9
99% Chebyshev(Mean, Sd) UCL	28.48

Data appear Normal (0.05)
May want to try Normal UCLs

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m,p-Xylene

Total Number of Data	20
Number of Non-Detect Data	18
Number of Detected Data	**2**
Minimum Detected	0.00132
Maximum Detected	0.00139
Percent Non-Detects	**90.00%**
Minimum Non-detect	3.21E-04
Maximum Non-detect	0.02

Mean of Detected Data	0.00136
Median of Detected Data	0.00136
Variance of Detected Data	2.45E-09
SD of Detected Data	4.95E-05
CV of Detected Data	0.0365
Skewness of Detected Data	N/A
Mean of Detected log data	-6.604

SD of Detected Log data	0.0365

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	20
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00132
SD	1.75E-05
Standard Error of Mean	6.38E-06
95% KM (t) UCL	0.00134
95% KM (z) UCL	0.00134
95% KM (BCA) UCL	0.00139
95% KM (Percentile Bootstrap) UCL	0.00139
95% KM (Chebyshev) UCL	0.00135
97.5% KM (Chebyshev) UCL	0.00136
99% KM (Chebyshev) UCL	0.00139
Potential UCL to Use	
95% KM (t) UCL	0.00134
95% KM (% Bootstrap) UCL	0.00139

***** Instead of UCL, EPC is selected to be median = <0.000416**
[per recommendation in ProUCL User Guide]

Manganese

Number of Valid Observations	37
Number of Distinct Observations	37
Minimum	82.3
Maximum	1210

Mean	351.2
Median	292
SD	202.8
Variance	41115
Coefficient of Variation	0.577
Skewness	2.166
Mean of log data	5.722
SD of log data	0.54
95% Useful UCLs	
Student's-t UCL	407.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	418.7
95% Modified-t UCL	409.4
Non-Parametric UCLs	
95% CLT UCL	406
95% Jackknife UCL	407.5
95% Standard Bootstrap UCL	407
95% Bootstrap-t UCL	425.2
95% Hall's Bootstrap UCL	461.7
95% Percentile Bootstrap UCL	410
95% BCA Bootstrap UCL	422.8
95% Chebyshev(Mean, Sd) UCL	496.5
97.5% Chebyshev(Mean, Sd) UCL	**559.4**
99% Chebyshev(Mean, Sd) UCL	682.9

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Mercury

Total Number of Data	37
Number of Non-Detect Data	23
Number of Detected Data	**14**
Minimum Detected	0.0034
Maximum Detected	0.064
Percent Non-Detects	**62.16%**
Minimum Non-detect	0.0023
Maximum Non-detect	0.026
Mean of Detected Data	0.0201
Median of Detected Data	0.0135
Variance of Detected Data	3.20E-04
SD of Detected Data	0.0179
CV of Detected Data	0.891
Skewness of Detected Data	1.5
Mean of Detected log data	-4.241
SD of Detected Log data	0.843

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	33
Number treated as Detected	4
Single DL Percent Detection	89.19%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0103
SD	0.0133
Standard Error of Mean	0.0023
95% KM (t) UCL	0.0142
95% KM (z) UCL	0.0141
95% KM (BCA) UCL	0.0168
95% KM (Percentile Bootstrap) UCL	0.0151
95% KM (Chebyshev) UCL	0.0203
97.5% KM (Chebyshev) UCL	**0.0246**
99% KM (Chebyshev) UCL	0.0331

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Methylcyclohexane

Total Number of Data	20
Number of Non-Detect Data	14
Number of Detected Data	**6**
Minimum Detected	0.0015
Maximum Detected	0.00278
Percent Non-Detects	**70.00%**
Minimum Non-detect	2.99E-04
Maximum Non-detect	0.019
Mean of Detected Data	0.00216
Median of Detected Data	0.0022
Variance of Detected Data	3.18E-07
SD of Detected Data	5.64E-04
CV of Detected Data	0.261
Skewness of Detected Data	-0.144
Mean of Detected log data	-6.167
SD of Detected Log data	0.273

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	20
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00176
SD	4.59E-04
Standard Error of Mean	1.30E-04
95% KM (t) UCL	0.00199
95% KM (z) UCL	0.00198
95% KM (BCA) UCL	0.00239
95% KM (Percentile Bootstrap) UCL	0.00228
95% KM (Chebyshev) UCL	0.00233
97.5% KM (Chebyshev) UCL	0.00258
99% KM (Chebyshev) UCL	0.00306

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.00152**
[per recommendation in ProUCL User Guide]

Molybdenum

Total Number of Data	37
Number of Non-Detect Data	15
Number of Detected Data	**22**
Minimum Detected	0.085
Maximum Detected	10.7
Percent Non-Detects	**40.54%**
Minimum Non-detect	0.074
Maximum Non-detect	0.086

Mean of Detected Data	0.947
Median of Detected Data	0.305
Variance of Detected Data	4.982
SD of Detected Data	2.232
CV of Detected Data	2.357
Skewness of Detected Data	4.348
Mean of Detected log data	-0.984
SD of Detected Log data	1.165

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	16
Number treated as Detected	21
Single DL Percent Detection	43.24%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	43.24%
Mean	0.129
SD	0.0199
95% Winsor (t) UCL	0.136

Kaplan Meier (KM) Method	
Mean	0.598
SD	1.734
Standard Error of Mean	0.292
95% KM (t) UCL	1.09
95% KM (z) UCL	1.078
95% KM (BCA) UCL	1.287
95% KM (Percentile Bootstrap) UCL	1.142
95% KM (Chebyshev) UCL	1.869
97.5% KM (Chebyshev) UCL	**2.42**
99% KM (Chebyshev) UCL	3.501

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Naphthalene

Total Number of Data	20
Number of Non-Detect Data	14
Number of Detected Data	**6**
Minimum Detected	0.0013
Maximum Detected	0.148
Percent Non-Detects	**70.00%**
Minimum Non-detect	3.16E-04
Maximum Non-detect	0.502

Mean of Detected Data	0.0273
Median of Detected Data	0.00339
Variance of Detected Data	0.0035
SD of Detected Data	0.0591
CV of Detected Data	2.162
Skewness of Detected Data	2.444
Mean of Detected log data	-5.25
SD of Detected Log data	1.743

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	20
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0102
SD	0.0335
Standard Error of Mean	0.00864
95% KM (t) UCL	0.0251
95% KM (z) UCL	0.0244
95% KM (BCA) UCL	0.0277
95% KM (Percentile Bootstrap) UCL	0.0259
95% KM (Chebyshev) UCL	0.0478
97.5% KM (Chebyshev) UCL	0.0641
99% KM (Chebyshev) UCL	0.0962

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

***** Instead of UCL, EPC is selected to be median = <0.00363**
[per recommendation in ProUCL User Guide]

Nickel

Number of Valid Observations	37
Number of Distinct Observations	33
Minimum	9.74
Maximum	51.7
Mean	17.27
Median	16.3
SD	6.719
Variance	45.15
Coefficient of Variation	0.389
Skewness	3.842
Mean of log data	2.802
SD of log data	0.287

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	19.14
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	19.83
95% Modified-t UCL	19.25
Non-Parametric UCLs	
95% CLT UCL	19.09
95% Jackknife UCL	19.14

95% Standard Bootstrap UCL	19.09
95% Bootstrap-t UCL	20.4
95% Hall's Bootstrap UCL	27.47
95% Percentile Bootstrap UCL	19.23
95% BCA Bootstrap UCL	20.14
95% Chebyshev(Mean, Sd) UCL	22.09
97.5% Chebyshev(Mean, Sd) UCL	24.17
99% Chebyshev(Mean, Sd) UCL	28.26

Potential UCL to Use

Use 95% Student's-t UCL	19.14
Or 95% Modified-t UCL	**19.25**

Phenanthrene

Total Number of Data	37
Number of Non-Detect Data	25
Number of Detected Data	**12**
Minimum Detected	0.018
Maximum Detected	1.83
Percent Non-Detects	**67.57%**
Minimum Non-detect	0.00729
Maximum Non-detect	0.0727

Mean of Detected Data	0.437
Median of Detected Data	0.107
Variance of Detected Data	0.413
SD of Detected Data	0.642
CV of Detected Data	1.471
Skewness of Detected Data	1.452
Mean of Detected log data	-2.039
SD of Detected Log data	1.689

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	31
Number treated as Detected	6
Single DL Percent Detection	83.78%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.154
SD	0.401
Standard Error of Mean	0.0689
95% KM (t) UCL	0.27
95% KM (z) UCL	0.267
95% KM (BCA) UCL	0.287
95% KM (Percentile Bootstrap) UCL	0.271

95% KM (Chebyshev) UCL	0.454
97.5% KM (Chebyshev) UCL	**0.584**
99% KM (Chebyshev) UCL	0.839

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Pyrene

Total Number of Data	38
Number of Non-Detect Data	25
Number of Detected Data	**13**
Minimum Detected	0.0149
Maximum Detected	4.64
Percent Non-Detects	**65.79%**
Minimum Non-detect	0.00882
Maximum Non-detect	0.0702
Mean of Detected Data	0.757
Median of Detected Data	0.208
Variance of Detected Data	1.814
SD of Detected Data	1.347
CV of Detected Data	1.78
Skewness of Detected Data	2.385
Mean of Detected log data	-1.682
SD of Detected Log data	1.817

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	28
Number treated as Detected	10
Single DL Percent Detection	73.68%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.269
SD	0.835
Standard Error of Mean	0.141
95% KM (t) UCL	0.506
95% KM (z) UCL	0.5
95% KM (BCA) UCL	0.554
95% KM (Percentile Bootstrap) UCL	0.508
95% KM (Chebyshev) UCL	0.883
97.5% KM (Chebyshev) UCL	**1.149**
99% KM (Chebyshev) UCL	1.671

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Silver

Total Number of Data	37
Number of Non-Detect Data	34
Number of Detected Data	**3**
Minimum Detected	0.092
Maximum Detected	0.41
Percent Non-Detects	**91.89%**
Minimum Non-detect	0.027
Maximum Non-detect	0.15

Mean of Detected Data	0.264
Median of Detected Data	0.29
Variance of Detected Data	0.0258
SD of Detected Data	0.161
CV of Detected Data	0.608
Skewness of Detected Data	-0.709
Mean of Detected log data	-1.505
SD of Detected Log data	0.782

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	35
Number treated as Detected	2
Single DL Percent Detection	94.59%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.106
SD	0.06
Standard Error of Mean	0.0121
95% KM (t) UCL	0.126
95% KM (z) UCL	0.126
95% KM (BCA) UCL	0.41
95% KM (Percentile Bootstrap) UCL	0.41
95% KM (Chebyshev) UCL	0.159
97.5% KM (Chebyshev) UCL	0.181
99% KM (Chebyshev) UCL	0.226

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.0590**
[per recommendation in ProUCL User Guide]

Strontium

Number of Valid Observations	37
Number of Distinct Observations	36
Minimum	22.1
Maximum	96.2
Mean	55.45
Median	52.6
SD	21.08
Variance	444.5
Coefficient of Variation	0.38
Skewness	0.194
Mean of log data	3.937
SD of log data	0.416
95% Useful UCLs	
Student's-t UCL	**61.31**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	61.27
95% Modified-t UCL	61.32
Non-Parametric UCLs	
95% CLT UCL	61.16
95% Jackknife UCL	61.31
95% Standard Bootstrap UCL	61.17
95% Bootstrap-t UCL	61.45
95% Hall's Bootstrap UCL	61.24
95% Percentile Bootstrap UCL	61.21
95% BCA Bootstrap UCL	61.21
95% Chebyshev(Mean, Sd) UCL	70.56
97.5% Chebyshev(Mean, Sd) UCL	77.1
99% Chebyshev(Mean, Sd) UCL	89.94

Data appear Normal (0.05)
May want to try Normal UCLs

Tetrachloroethene

Total Number of Data	20
Number of Non-Detect Data	17
Number of Detected Data	**3**
Minimum Detected	0.00135
Maximum Detected	0.223
Percent Non-Detects	**85.00%**

Minimum Non-detect	1.55E-04
Maximum Non-detect	0.0098
Mean of Detected Data	0.076
Median of Detected Data	0.00362
Variance of Detected Data	0.0162
SD of Detected Data	0.127
CV of Detected Data	1.675
Skewness of Detected Data	1.731
Mean of Detected log data	-4.577
SD of Detected Log data	2.709

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	1
Single DL Percent Detection	95.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0126
SD	0.0483
Standard Error of Mean	0.0132
95% KM (t) UCL	0.0354
95% KM (z) UCL	0.0343
95% KM (BCA) UCL	0.223
95% KM (Percentile Bootstrap) UCL	0.223
95% KM (Chebyshev) UCL	0.0702
97.5% KM (Chebyshev) UCL	0.0951
99% KM (Chebyshev) UCL	0.144

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

***** Instead of UCL, EPC is selected to be median = <0.000211**
[per recommendation in ProUCL User Guide]

Thallium

Total Number of Data	37

Data set has all detected values equal to = 0.63, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.63

***** Instead of UCL, EPC is selected to be median = <0.100**
[per recommendation in ProUCL User Guide]

Tin

Total Number of Data	37
Number of Non-Detect Data	32
Number of Detected Data	**5**
Minimum Detected	0.68
Maximum Detected	3.67
Percent Non-Detects	**86.49%**
Minimum Non-detect	0.39
Maximum Non-detect	2.17

Mean of Detected Data	1.568
Median of Detected Data	1.15
Variance of Detected Data	1.526
SD of Detected Data	1.235
CV of Detected Data	0.788
Skewness of Detected Data	1.747
Mean of Detected log data	0.242
SD of Detected Log data	0.691

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	36
Number treated as Detected	1
Single DL Percent Detection	97.30%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.801
SD	0.508
Standard Error of Mean	0.0935
95% KM (t) UCL	0.959
95% KM (z) UCL	0.955

95% KM (BCA) UCL	1.842
95% KM (Percentile Bootstrap) UCL	1.324
95% KM (Chebyshev) UCL	1.208
97.5% KM (Chebyshev) UCL	1.385
99% KM (Chebyshev) UCL	1.731

Data appear Normal (0.05)
May want to try Normal UCLs

***** Instead of UCL, EPC is selected to be median = <0.570**
[per recommendation in ProUCL User Guide]

Titanium

Number of Valid Observations	37
Number of Distinct Observations	34
Minimum	3.41
Maximum	57
Mean	21.67
Median	18.5
SD	13.71
Variance	188
Coefficient of Variation	0.633
Skewness	1.293
Mean of log data	2.884
SD of log data	0.657
95% Useful UCLs	
Student's-t UCL	25.47
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	25.89
95% Modified-t UCL	25.55
Non-Parametric UCLs	
95% CLT UCL	25.38
95% Jackknife UCL	25.47
95% Standard Bootstrap UCL	25.22
95% Bootstrap-t UCL	26.24
95% Hall's Bootstrap UCL	26.06
95% Percentile Bootstrap UCL	25.4
95% BCA Bootstrap UCL	25.56
95% Chebyshev(Mean, Sd) UCL	31.49
97.5% Chebyshev(Mean, Sd) UCL	**35.74**
99% Chebyshev(Mean, Sd) UCL	44.1

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Toluene

Total Number of Data	20

Number of Non-Detect Data	12
Number of Detected Data	**8**
Minimum Detected	0.00134
Maximum Detected	0.0122
Percent Non-Detects	**60.00%**
Minimum Non-detect	4.78E-04
Maximum Non-detect	0.028
Mean of Detected Data	0.00491
Median of Detected Data	0.00445
Variance of Detected Data	1.06E-05
SD of Detected Data	0.00325
CV of Detected Data	0.662
Skewness of Detected Data	1.816
Mean of Detected log data	-5.488
SD of Detected Log data	0.635

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	20
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00324
SD	0.00285
Standard Error of Mean	7.86E-04
95% KM (t) UCL	0.0046
95% KM (z) UCL	0.00454
95% KM (BCA) UCL	0.00555
95% KM (Percentile Bootstrap) UCL	0.00509
95% KM (Chebyshev) UCL	0.00667
97.5% KM (Chebyshev) UCL	**0.00815**
99% KM (Chebyshev) UCL	0.0111

Data appear Normal (0.05)
May want to try Normal UCLs

Vanadium

Number of Valid Observations	37
Number of Distinct Observations	34

Minimum	7.85
Maximum	45.8
Mean	20.58
Median	19.6
SD	8.272
Variance	68.43
Coefficient of Variation	0.402
Skewness	0.643
Mean of log data	2.94
SD of log data	0.429
95% Useful UCLs	
Student's-t UCL	**22.87**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	22.97
95% Modified-t UCL	22.9
Non-Parametric UCLs	
95% CLT UCL	22.81
95% Jackknife UCL	22.87
95% Standard Bootstrap UCL	22.78
95% Bootstrap-t UCL	22.96
95% Hall's Bootstrap UCL	23.07
95% Percentile Bootstrap UCL	22.78
95% BCA Bootstrap UCL	23.02
95% Chebyshev(Mean, Sd) UCL	26.51
97.5% Chebyshev(Mean, Sd) UCL	29.07
99% Chebyshev(Mean, Sd) UCL	34.11

Data appear Normal (0.05)
May want to try Normal UCLs

Xylene (total)

Total Number of Data	20
Number of Non-Detect Data	11
Number of Detected Data	**9**
Minimum Detected	0.00139
Maximum Detected	1.76
Percent Non-Detects	**55.00%**
Minimum Non-detect	4.62E-04
Maximum Non-detect	0.0264
Mean of Detected Data	0.41
Median of Detected Data	0.069
Variance of Detected Data	0.475
SD of Detected Data	0.689
CV of Detected Data	1.682
Skewness of Detected Data	1.647
Mean of Detected log data	-2.638
SD of Detected Log data	2.381

Note: Data have multiple DLs - Use of KM Method is recommended	
For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	13
Number treated as Detected	7
Single DL Percent Detection	65.00%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.185
SD	0.481
Standard Error of Mean	0.114
95% KM (t) UCL	0.382
95% KM (z) UCL	0.373
95% KM (BCA) UCL	0.427
95% KM (Percentile Bootstrap) UCL	0.379
95% KM (Chebyshev) UCL	0.682
97.5% KM (Chebyshev) UCL	**0.897**
99% KM (Chebyshev) UCL	1.319

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Zinc

Number of Valid Observations	37
Number of Distinct Observations	37
Minimum	21.1
Maximum	5640
Mean	239.6
Median	49.8
SD	916.6
Variance	840136
Coefficient of Variation	3.826
Skewness	5.999
Mean of log data	4.303
SD of log data	1.03

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	494

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	646.2
95% Modified-t UCL	518.7
Non-Parametric UCLs	
95% CLT UCL	487.4
95% Jackknife UCL	494
95% Standard Bootstrap UCL	489.6
95% Bootstrap-t UCL	2479
95% Hall's Bootstrap UCL	1501
95% Percentile Bootstrap UCL	534.6
95% BCA Bootstrap UCL	718.7
95% Chebyshev(Mean, Sd) UCL	896.4
97.5% Chebyshev(Mean, Sd) UCL	1181
99% Chebyshev(Mean, Sd) UCL	1739
Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	**1739**

APPENDIX A-5

BACKGROUND SOIL

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . . \ProUCL data analysis\BACKGROUND AREA SOIL\BACKGROUND AREA SOIL_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony

Total Number of Data	10
Number of Non-Detect Data	5
Number of Detected Data	**5**
Minimum Detected	1.48
Maximum Detected	2.19
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.25
Maximum Non-detect	0.3
Mean of Detected Data	1.768
Median of Detected Data	1.69
Variance of Detected Data	0.0732
SD of Detected Data	0.271
CV of Detected Data	0.153
Skewness of Detected Data	1.024
Mean of Detected log data	0.561
SD of Detected Log data	0.148

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	1.624
SD	0.224
Standard Error of Mean	0.0791
95% KM (t) UCL	1.769
95% KM (z) UCL	1.754
95% KM (BCA) UCL	1.89
95% KM (Percentile Bootstrap) UCL	1.815
95% KM (Chebyshev) UCL	1.969
97.5% KM (Chebyshev) UCL	2.118

99% KM (Chebyshev) UCL	2.411

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.890**
[per recommendation in ProUCL User Guide]

Arsenic

Total Number of Data	10
Number of Non-Detect Data	1
Number of Detected Data	**9**
Minimum Detected	1.69
Maximum Detected	5.9
Percent Non-Detects	**10.00%**
Minimum Non-detect	0.24
Maximum Non-detect	0.24

Mean of Detected Data	3.793
Median of Detected Data	3.72
Variance of Detected Data	2.191
SD of Detected Data	1.48
CV of Detected Data	0.39
Skewness of Detected Data	-0.0437
Mean of Detected log data	1.253
SD of Detected Log data	0.448

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.448
Mean	3.566
SD	1.518
95% Winsor (t) UCL	**4.476**

Kaplan Meier (KM) Method	
Mean	3.583
SD	1.467
Standard Error of Mean	0.492
95% KM (t) UCL	4.485
95% KM (z) UCL	4.392
95% KM (BCA) UCL	4.441
95% KM (Percentile Bootstrap) UCL	4.423
95% KM (Chebyshev) UCL	5.727
97.5% KM (Chebyshev) UCL	6.655

99% KM (Chebyshev) UCL	8.477

Data appear Normal (0.05)
May want to try Normal UCLs

Barium

Number of Valid Observations	10
Number of Distinct Observations	8
Minimum	150
Maximum	1130
Mean	333.1
Median	259
SD	288.1
Variance	82980
Coefficient of Variation	0.865
Skewness	2.844
Mean of log data	5.617
SD of log data	0.571
95% Useful UCLs	
Student's-t UCL	500.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	570.5
95% Modified-t UCL	513.7
Non-Parametric UCLs	
95% CLT UCL	482.9
95% Jackknife UCL	500.1
95% Standard Bootstrap UCL	476.8
95% Bootstrap-t UCL	864.1
95% Hall's Bootstrap UCL	1100
95% Percentile Bootstrap UCL	497.6
95% BCA Bootstrap UCL	584.8
95% Chebyshev(Mean, Sd) UCL	730.2
97.5% Chebyshev(Mean, Sd) UCL	**902**
99% Chebyshev(Mean, Sd) UCL	1239

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Benzo(a)anthracene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.082
Maximum Detected	0.082
Percent Non-Detects	**90.00%**

Minimum Non-detect	0.00646
Maximum Non-detect	0.00908

Data set has all detected values equal to = 0.082, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.082

**** Instead of UCL, EPC is selected to be median = <0.00761**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.076
Maximum Detected	0.076
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00868
Maximum Non-detect	0.012

Data set has all detected values equal to = 0.076, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.076

**** Instead of UCL, EPC is selected to be median = <0.0100**
[per recommendation in ProUCL User Guide]

Benzo(b)fluoranthene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.057
Maximum Detected	0.057
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00698
Maximum Non-detect	0.00981

Data set has all detected values equal to = 0.057, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.057

**** Instead of UCL, EPC is selected to be median = <0.00822**
[per recommendation in ProUCL User Guide]

Benzo(g,h,i)perylene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.083
Maximum Detected	0.083
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.03
Maximum Non-detect	0.042

Data set has all detected values equal to = 0.083, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.083

**** Instead of UCL, EPC is selected to be median = <0.035**
[per recommendation in ProUCL User Guide]

Benzo(k)fluoranthene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.106
Maximum Detected	0.106
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00985
Maximum Non-detect	0.014

Data set has all detected values equal to = 0.106, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.106

**** Instead of UCL, EPC is selected to be median = <0.0115**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data	10
Number of Non-Detect Data	7
Number of Detected Data	**3**
Minimum Detected	0.041
Maximum Detected	0.11
Percent Non-Detects	**70.00%**
Minimum Non-detect	0.015
Maximum Non-detect	0.02
Mean of Detected Data	0.083

Median of Detected Data	0.098
Variance of Detected Data	0.00136
SD of Detected Data	0.0369
CV of Detected Data	0.444
Skewness of Detected Data	-1.528
Mean of Detected log data	-2.575
SD of Detected Log data	0.54

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0536
SD	0.0253
Standard Error of Mean	0.00982
95% KM (t) UCL	0.0716
95% KM (z) UCL	0.0697
95% KM (BCA) UCL	0.11
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0964
97.5% KM (Chebyshev) UCL	0.115
99% KM (Chebyshev) UCL	0.151

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.019**
[per recommendation in ProUCL User Guide]

Carbazole

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.011
Maximum Detected	0.011
Percent Non-Detects	**90.00%**

Minimum Non-detect	0.00752
Maximum Non-detect	0.011

Data set has all detected values equal to = 0.011, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.011

**** Instead of UCL, EPC is selected to be median = <0.00886**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	10.7
Maximum	20.1
Mean	15.2
Median	14.15
SD	3.02
Variance	9.12
Coefficient of Variation	0.199
Skewness	0.27
Mean of log data	2.703
SD of log data	0.199
95% Useful UCLs	
Student's-t UCL	**16.95**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.86
95% Modified-t UCL	16.96
Non-Parametric UCLs	
95% CLT UCL	16.77
95% Jackknife UCL	16.95
95% Standard Bootstrap UCL	16.68
95% Bootstrap-t UCL	17.21
95% Hall's Bootstrap UCL	16.78
95% Percentile Bootstrap UCL	16.65
95% BCA Bootstrap UCL	16.72
95% Chebyshev(Mean, Sd) UCL	19.36
97.5% Chebyshev(Mean, Sd) UCL	21.16
99% Chebyshev(Mean, Sd) UCL	24.7

Data appear Normal (0.05)
May want to try Normal UCLs

Chrysene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.083
Maximum Detected	0.083
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.012
Maximum Non-detect	0.016

Data set has all detected values equal to = 0.083, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.083

**** Instead of UCL, EPC is selected to be median = <0.014**
[per recommendation in ProUCL User Guide]

Copper

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	7.68
Maximum	19.3
Mean	12.12
Median	10.8
SD	3.955
Variance	15.64
Coefficient of Variation	0.326
Skewness	0.802
Mean of log data	2.449
SD of log data	0.313
95% Useful UCLs	
Student's-t UCL	**14.41**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	14.51
95% Modified-t UCL	14.46
Non-Parametric UCLs	
95% CLT UCL	14.17
95% Jackknife UCL	14.41
95% Standard Bootstrap UCL	14.1
95% Bootstrap-t UCL	15.2
95% Hall's Bootstrap UCL	14.64
95% Percentile Bootstrap UCL	14.27
95% BCA Bootstrap UCL	14.33
95% Chebyshev(Mean, Sd) UCL	17.57
97.5% Chebyshev(Mean, Sd) UCL	19.93
99% Chebyshev(Mean, Sd) UCL	24.56

Data appear Normal (0.05)
May want to try Normal UCLs

Fluoranthene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.156
Maximum Detected	0.156
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00971
Maximum Non-detect	0.014

Data set has all detected values equal to = 0.156, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.156

**** Instead of UCL, EPC is selected to be median = <0.0115**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.417
Maximum Detected	0.417
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.025
Maximum Non-detect	0.035

Data set has all detected values equal to = 0.417, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.417

**** Instead of UCL, EPC is selected to be median = <0.0295**
[per recommendation in ProUCL User Guide]

Lead

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	11
Maximum	15.2
Mean	13.43
Median	13.35

SD	1.547
Variance	2.393
Coefficient of Variation	0.115
Skewness	-0.326
Mean of log data	2.591
SD of log data	0.118

95% Useful UCLs	
Student's-t UCL	**14.33**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	14.18
95% Modified-t UCL	14.32

Non-Parametric UCLs	
95% CLT UCL	14.23
95% Jackknife UCL	14.33
95% Standard Bootstrap UCL	14.18
95% Bootstrap-t UCL	14.22
95% Hall's Bootstrap UCL	14.12
95% Percentile Bootstrap UCL	14.16
95% BCA Bootstrap UCL	14.14
95% Chebyshev(Mean, Sd) UCL	15.56
97.5% Chebyshev(Mean, Sd) UCL	16.49
99% Chebyshev(Mean, Sd) UCL	18.3

Data appear Normal (0.05)
May want to try Normal UCLs

Lithium

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	14.4
Maximum	32.5
Mean	21.14
Median	19.9
SD	5.166
Variance	26.68
Coefficient of Variation	0.244
Skewness	1.214
Mean of log data	3.027
SD of log data	0.229

95% Useful UCLs	
Student's-t UCL	**24.13**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	24.5
95% Modified-t UCL	24.24

Non-Parametric UCLs	
95% CLT UCL	23.83
95% Jackknife UCL	24.13
95% Standard Bootstrap UCL	23.69
95% Bootstrap-t UCL	25.68
95% Hall's Bootstrap UCL	40.06
95% Percentile Bootstrap UCL	23.85
95% BCA Bootstrap UCL	24.34
95% Chebyshev(Mean, Sd) UCL	28.26
97.5% Chebyshev(Mean, Sd) UCL	31.34
99% Chebyshev(Mean, Sd) UCL	37.39

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	284
Maximum	551
Mean	377.4
Median	333
SD	93.76
Variance	8791
Coefficient of Variation	0.248
Skewness	1.28
Mean of log data	5.909
SD of log data	0.227
95% Useful UCLs	
Student's-t UCL	431.8
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	439
95% Modified-t UCL	433.8
Non-Parametric UCLs	
95% CLT UCL	426.2
95% Jackknife UCL	431.8
95% Standard Bootstrap UCL	424.1
95% Bootstrap-t UCL	499.4
95% Hall's Bootstrap UCL	650.1
95% Percentile Bootstrap UCL	425.8
95% BCA Bootstrap UCL	435.2
95% Chebyshev(Mean, Sd) UCL	**506.6**
97.5% Chebyshev(Mean, Sd) UCL	562.6
99% Chebyshev(Mean, Sd) UCL	672.4

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Mercury

Number of Valid Observations	10
Number of Distinct Observations	8
Minimum	0.015
Maximum	0.03
Mean	0.0213
Median	0.0195
SD	0.00479
Variance	2.29E-05
Coefficient of Variation	0.225
Skewness	0.734
Mean of log data	-3.871
SD of log data	0.217

95% Useful UCLs	
Student's-t UCL	**0.0241**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.0242
95% Modified-t UCL	0.0241
Non-Parametric UCLs	
95% CLT UCL	0.0238
95% Jackknife UCL	0.0241
95% Standard Bootstrap UCL	0.0237
95% Bootstrap-t UCL	0.0247
95% Hall's Bootstrap UCL	0.0242
95% Percentile Bootstrap UCL	0.0238
95% BCA Bootstrap UCL	0.0238
95% Chebyshev(Mean, Sd) UCL	0.0279
97.5% Chebyshev(Mean, Sd) UCL	0.0308
99% Chebyshev(Mean, Sd) UCL	0.0364

Data appear Normal (0.05)
May want to try Normal UCLs

Molybdenum

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	0.42
Maximum	0.68
Mean	0.522
Median	0.505
SD	0.0739
Variance	0.00546
Coefficient of Variation	0.142
Skewness	0.94

Mean of log data	-0.659
SD of log data	0.137

95% Useful UCLs	
Student's-t UCL	**0.565**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.568
95% Modified-t UCL	0.566

Non-Parametric UCLs	
95% CLT UCL	0.56
95% Jackknife UCL	0.565
95% Standard Bootstrap UCL	0.559
95% Bootstrap-t UCL	0.578
95% Hall's Bootstrap UCL	0.582
95% Percentile Bootstrap UCL	0.561
95% BCA Bootstrap UCL	0.563
95% Chebyshev(Mean, Sd) UCL	0.624
97.5% Chebyshev(Mean, Sd) UCL	0.668
99% Chebyshev(Mean, Sd) UCL	0.755

Data appear Normal (0.05)
May want to try Normal UCLs

Phenanthrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.137
Maximum Detected	0.137
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.00571
Maximum Non-detect	0.00803

Data set has all detected values equal to = 0.137, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.137

**** Instead of UCL, EPC is selected to be median = <0.00672**
[per recommendation in ProUCL User Guide]

Pyrene

Total Number of Data	10
Number of Non-Detect Data	9
Number of Detected Data	**1**
Minimum Detected	0.127

Maximum Detected	0.127
Percent Non-Detects	**90.00%**
Minimum Non-detect	0.017
Maximum Non-detect	0.024

Data set has all detected values equal to = 0.127, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.127

**** Instead of UCL, EPC is selected to be median = <0.0200**
[per recommendation in ProUCL User Guide]

Zinc

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	36.6
Maximum	969
Mean	247
Median	75.5
SD	364.6
Variance	132938
Coefficient of Variation	1.476
Skewness	1.694
Mean of log data	4.667
SD of log data	1.272

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	458.3
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	502.6
95% Modified-t UCL	468.6
Non-Parametric UCLs	
95% CLT UCL	436.6
95% Jackknife UCL	458.3
95% Standard Bootstrap UCL	424.9
95% Bootstrap-t UCL	1356
95% Hall's Bootstrap UCL	1731
95% Percentile Bootstrap UCL	432.1
95% BCA Bootstrap UCL	507.2
95% Chebyshev(Mean, Sd) UCL	**749.5**
97.5% Chebyshev(Mean, Sd) UCL	967
99% Chebyshev(Mean, Sd) UCL	1394
Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	1394

Recommended UCL exceeds the maximum observation

APPENDIX A-6

INTRACOASTAL WATERWAY SEDIMENT

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	c:\Users\Michael\ . . . \ProUCL data analysis\ICWsed - Just site data\ICWsed - Just site data_ProUCL sheets.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2-Dichloroethane

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.00302
Maximum Detected	0.00302
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.000184
Maximum Non-detect	0.000877

Data set has all detected values equal to = 0.00302, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00302

**** Instead of UCL, EPC is selected to be median = <0.000358**
[per recommendation in ProUCL User Guide]

1,2-Diphenylhydrazine/Azobenzen

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0317
Maximum Detected	0.0317
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0101
Maximum Non-detect	0.0146

Data set has all detected values equal to = 0.0317, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0317

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

2-Methylnaphthalene

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0188
Maximum Detected	0.0188
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0132
Maximum Non-detect	0.0191

Data set has all detected values equal to = 0.0188, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects

Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0188

**** Instead of UCL, EPC is selected to be median = <0.0146**
[per recommendation in ProUCL User Guide]

3,3'-Dichlorobenzidine

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.151
Maximum Detected	0.151
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0586
Maximum Non-detect	0.0846

Data set has all detected values equal to = 0.151, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.151

**** Instead of UCL, EPC is selected to be median = <0.0632**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	17
Number of Non-Detect Data	13
Number of Detected Data	**4**
Minimum Detected	4.81E-04
Maximum Detected	0.00332
Percent Non-Detects	**76.47%**
Minimum Non-detect	1.77E-04
Maximum Non-detect	6.31E-04
Mean of Detected Data	0.00137
Median of Detected Data	8.38E-04
Variance of Detected Data	1.77E-06
SD of Detected Data	0.00133
CV of Detected Data	0.971
Skewness of Detected Data	1.763
Mean of Detected log data	-6.905
SD of Detected Log data	0.874

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	15
Number treated as Detected	2
Single DL Percent Detection	88.24%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	6.90E-04
SD	6.73E-04
Standard Error of Mean	1.89E-04
95% KM (t) UCL	0.00102
95% KM (z) UCL	0.001
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.00136
95% KM (Chebyshev) UCL	0.00151
97.5% KM (Chebyshev) UCL	0.00187
99% KM (Chebyshev) UCL	0.00257

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000203**
[per recommendation in ProUCL User Guide]

4,6-Dinitro-2-methylphenol

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0627
Maximum Detected	0.0627
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0245
Maximum Non-detect	0.0353

Data set has all detected values equal to = 0.0627, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0627

**** Instead of UCL, EPC is selected to be median = <0.0264**
[per recommendation in ProUCL User Guide]

Acenaphthene

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.0239
Maximum Detected	0.0631
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.0122
Maximum Non-detect	0.0176
Mean of Detected Data	0.0435
Median of Detected Data	0.0435
Variance of Detected Data	7.68E-04
SD of Detected Data	0.0277
CV of Detected Data	0.637
Skewness of Detected Data	N/A
Mean of Detected log data	-3.248
SD of Detected Log data	0.686

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),

the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0264
SD	0.00949
Standard Error of Mean	0.00335
95% KM (t) UCL	0.0322
95% KM (z) UCL	0.0319
95% KM (BCA) UCL	6.31%
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.041
97.5% KM (Chebyshev) UCL	0.0473
99% KM (Chebyshev) UCL	0.0597
Potential UCL to Use	
95% KM (t) UCL	0.0322
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.0135**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	3900
Maximum	12500
Mean	6854
Median	6345
SD	2346
Variance	5502706
Coefficient of Variation	0.342
Skewness	0.876
Mean of log data	8.781
SD of log data	0.331
95% Useful UCLs	
Student's-t UCL	**7882**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7956
95% Modified-t UCL	7904

Non-Parametric UCLs	
95% CLT UCL	7819
95% Jackknife UCL	7882
95% Standard Bootstrap UCL	7734
95% Bootstrap-t UCL	8049
95% Hall's Bootstrap UCL	8144
95% Percentile Bootstrap UCL	7782
95% BCA Bootstrap UCL	7899
95% Chebyshev(Mean, Sd) UCL	9411
97.5% Chebyshev(Mean, Sd) UCL	10517
99% Chebyshev(Mean, Sd) UCL	12689

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0236
Maximum Detected	0.0753
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0134
Maximum Non-detect	0.019
Mean of Detected Data	0.0407
Median of Detected Data	0.0333
Variance of Detected Data	4.37E-04
SD of Detected Data	0.0209
CV of Detected Data	0.513
Skewness of Detected Data	1.021
Mean of Detected log data	-3.304
SD of Detected Log data	0.487

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.03
SD	0.0143
Standard Error of Mean	0.00392
95% KM (t) UCL	0.0369
95% KM (z) UCL	0.0365
95% KM (BCA) UCL	0.0431
95% KM (Percentile Bootstrap) UCL	0.0397
95% KM (Chebyshev) UCL	0.0471
97.5% KM (Chebyshev) UCL	0.0545
99% KM (Chebyshev) UCL	0.069

Data appear Normal (0.05)

May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median =**	**<0.0178**
[per recommendation in ProUCL User Guide]	

Antimony

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	0.74
Maximum	8.14
Mean	2.245
Median	1.75
SD	1.751
Variance	3.066
Coefficient of Variation	0.78
Skewness	2.813
Mean of log data	0.629
SD of log data	0.57
95% Useful UCLs	
Student's-t UCL	3.012
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	3.294
95% Modified-t UCL	3.064
Non-Parametric UCLs	
95% CLT UCL	2.965
95% Jackknife UCL	3.012
95% Standard Bootstrap UCL	2.932
95% Bootstrap-t UCL	3.876
95% Hall's Bootstrap UCL	5.819
95% Percentile Bootstrap UCL	3.012
95% BCA Bootstrap UCL	3.276
95% Chebyshev(Mean, Sd) UCL	4.153
97.5% Chebyshev(Mean, Sd) UCL	**4.979**
99% Chebyshev(Mean, Sd) UCL	6.601

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Arsenic

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	2.41
Maximum	7.62
Mean	4.026
Median	3.805
SD	1.4
Variance	1.96
Coefficient of Variation	0.348
Skewness	1.175
Mean of log data	1.341
SD of log data	0.327
95% Useful UCLs	
Student's-t UCL	**4.64**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	4.712
95% Modified-t UCL	4.657
Non-Parametric UCLs	
95% CLT UCL	4.602
95% Jackknife UCL	4.64
95% Standard Bootstrap UCL	4.577
95% Bootstrap-t UCL	4.825
95% Hall's Bootstrap UCL	4.993
95% Percentile Bootstrap UCL	4.638
95% BCA Bootstrap UCL	4.73
95% Chebyshev(Mean, Sd) UCL	5.552
97.5% Chebyshev(Mean, Sd) UCL	6.212
99% Chebyshev(Mean, Sd) UCL	7.508

Data appear Normal (0.05)
May want to try Normal UCLs

Atrazine (Aatrex)

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0814
Maximum Detected	0.0814
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.024
Maximum Non-detect	0.0346

Data set has all detected values equal to = 0.0814, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0814

**** Instead of UCL, EPC is selected to be median = <0.0259**
[per recommendation in ProUCL User Guide]

Barium

Number of Valid Observations	16
Number of Distinct Observations	14
Minimum	116
Maximum	377
Mean	215.3
Median	198
SD	59.65
Variance	3558
Coefficient of Variation	0.277
Skewness	1.296
Mean of log data	5.339
SD of log data	0.263
95% Useful UCLs	
Student's-t UCL	241.4
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	244.9
95% Modified-t UCL	242.2

Non-Parametric UCLs	
95% CLT UCL	239.8
95% Jackknife UCL	241.4
95% Standard Bootstrap UCL	238.7
95% Bootstrap-t UCL	250
95% Hall's Bootstrap UCL	263.8
95% Percentile Bootstrap UCL	241.7
95% BCA Bootstrap UCL	244.2
95% Chebyshev(Mean, Sd) UCL	280.3
97.5% Chebyshev(Mean, Sd) UCL	**308.4**
99% Chebyshev(Mean, Sd) UCL	363.6

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(a)anthracene

Total Number of Data	16
Number of Non-Detect Data	13
Number of Detected Data	**3**
Minimum Detected	0.0675
Maximum Detected	0.395
Percent Non-Detects	**81.25%**
Minimum Non-detect	0.0125
Maximum Non-detect	0.018
Mean of Detected Data	0.212
Median of Detected Data	0.172
Variance of Detected Data	0.028
SD of Detected Data	0.167
CV of Detected Data	0.791
Skewness of Detected Data	1.003
Mean of Detected log data	-1.795
SD of Detected Log data	0.884

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0945
SD	0.0816
Standard Error of Mean	0.025
95% KM (t) UCL	0.138
95% KM (z) UCL	0.136
95% KM (BCA) UCL	0.395
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.203

97.5% KM (Chebyshev) UCL	0.251
99% KM (Chebyshev) UCL	0.343

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0138**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0525
Maximum Detected	0.445
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.0176
Mean of Detected Data	0.165
Median of Detected Data	0.122
Variance of Detected Data	0.0209
SD of Detected Data	0.145
CV of Detected Data	0.879
Skewness of Detected Data	1.933
Mean of Detected log data	-2.063
SD of Detected Log data	0.755

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0946
SD	0.0974
Standard Error of Mean	0.0267
95% KM (t) UCL	0.141
95% KM (z) UCL	0.138
95% KM (BCA) UCL	0.189
95% KM (Percentile Bootstrap) UCL	0.158
95% KM (Chebyshev) UCL	0.211
97.5% KM (Chebyshev) UCL	0.261
99% KM (Chebyshev) UCL	0.36

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0158**

[per recommendation in ProUCL User Guide]

Benzo(b)fluoranthene

Total Number of Data	16
Number of Non-Detect Data	7
Number of Detected Data	**9**
Minimum Detected	0.0324
Maximum Detected	0.611
Percent Non-Detects	**43.75%**
Minimum Non-detect	0.00865
Maximum Non-detect	0.0123

Mean of Detected Data	0.174
Median of Detected Data	0.131
Variance of Detected Data	0.0321
SD of Detected Data	0.179
CV of Detected Data	1.028
Skewness of Detected Data	2.123
Mean of Detected log data	-2.149
SD of Detected Log data	0.957

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.112
SD	0.145
Standard Error of Mean	0.0384
95% KM (t) UCL	0.18
95% KM (z) UCL	0.175
95% KM (BCA) UCL	0.196
95% KM (Percentile Bootstrap) UCL	0.185
95% KM (Chebyshev) UCL	0.28
97.5% KM (Chebyshev) UCL	**0.352**
99% KM (Chebyshev) UCL	0.495

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(g,h,i)perylene

Total Number of Data	16
Number of Non-Detect Data	9
Number of Detected Data	**7**
Minimum Detected	0.0173
Maximum Detected	0.442
Percent Non-Detects	**56.25%**
Minimum Non-detect	0.0124
Maximum Non-detect	0.0176

Mean of Detected Data	0.142
Median of Detected Data	0.069
Variance of Detected Data	0.0221
SD of Detected Data	0.149
CV of Detected Data	1.046
Skewness of Detected Data	1.69
Mean of Detected log data	-2.409
SD of Detected Log data	1.064

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	10
Number treated as Detected	6
Single DL Percent Detection	62.50%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0719
SD	0.11
Standard Error of Mean	0.0297
95% KM (t) UCL	0.124
95% KM (z) UCL	0.121
95% KM (BCA) UCL	0.162
95% KM (Percentile Bootstrap) UCL	0.136
95% KM (Chebyshev) UCL	0.202
97.5% KM (Chebyshev) UCL	0.258
99% KM (Chebyshev) UCL	0.368

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0172**
[per recommendation in ProUCL User Guide]

Benzo(k)fluoranthene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0474
Maximum Detected	0.318
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0191
Maximum Non-detect	0.0272

Mean of Detected Data	0.139
Median of Detected Data	0.118
Variance of Detected Data	0.00945
SD of Detected Data	0.0972
CV of Detected Data	0.699
Skewness of Detected Data	1.495

Mean of Detected log data	-2.16
SD of Detected Log data	0.666

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0818
SD	0.0702
Standard Error of Mean	0.0192
95% KM (t) UCL	0.115
95% KM (z) UCL	0.113
95% KM (BCA) UCL	0.159
95% KM (Percentile Bootstrap) UCL	0.142
95% KM (Chebyshev) UCL	0.166
97.5% KM (Chebyshev) UCL	0.202
99% KM (Chebyshev) UCL	0.273

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0243**
[per recommendation in ProUCL User Guide]

Beryllium

Number of Valid Observations	16
Number of Distinct Observations	12
Minimum	0.29
Maximum	0.82
Mean	0.463
Median	0.42
SD	0.149
Variance	0.0222
Coefficient of Variation	0.322
Skewness	0.894
Mean of log data	-0.815
SD of log data	0.307

95% Useful UCLs	
Student's-t UCL	**0.528**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.533
95% Modified-t UCL	0.53

Non-Parametric UCLs	
95% CLT UCL	0.524
95% Jackknife UCL	0.528
95% Standard Bootstrap UCL	0.524
95% Bootstrap-t UCL	0.54

95% Hall's Bootstrap UCL	0.54
95% Percentile Bootstrap UCL	0.524
95% BCA Bootstrap UCL	0.533
95% Chebyshev(Mean, Sd) UCL	0.625
97.5% Chebyshev(Mean, Sd) UCL	0.696
99% Chebyshev(Mean, Sd) UCL	0.834

Data appear Normal (0.05)
May want to try Normal UCLs

Boron

Total Number of Data	16
Number of Non-Detect Data	6
Number of Detected Data	**10**
Minimum Detected	12.5
Maximum Detected	27.2
Percent Non-Detects	**37.50%**
Minimum Non-detect	1.35
Maximum Non-detect	1.92
Mean of Detected Data	18.82
Median of Detected Data	19.7
Variance of Detected Data	27.9
SD of Detected Data	5.282
CV of Detected Data	0.281
Skewness of Detected Data	0.171
Mean of Detected log data	2.898
SD of Detected Log data	0.287

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.287
Mean	13.19
SD	0.643
95% Winsor (t) UCL	13.57

Kaplan Meier (KM) Method	
Mean	16.45
SD	5.006
Standard Error of Mean	1.319
95% KM (t) UCL	18.76
95% KM (z) UCL	18.62
95% KM (BCA) UCL	19.25
95% KM (Percentile Bootstrap) UCL	18.86
95% KM (Chebyshev) UCL	22.2
97.5% KM (Chebyshev) UCL	**24.69**
99% KM (Chebyshev) UCL	29.58

Data appear Normal (0.05)
May want to try Normal UCLs

Butyl benzyl phthalate

Total Number of Data	16
Number of Non-Detect Data	15

Number of Detected Data	**1**
Minimum Detected	0.202
Maximum Detected	0.202
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0153
Maximum Non-detect	0.0221

Data set has all detected values equal to = 0.202, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.202

**** Instead of UCL, EPC is selected to be median = <0.0165**
[per recommendation in ProUCL User Guide]

Carbazole

Total Number of Data	16
Number of Non-Detect Data	13
Number of Detected Data	**3**
Minimum Detected	0.0195
Maximum Detected	0.0861
Percent Non-Detects	**81.25%**
Minimum Non-detect	0.0121
Maximum Non-detect	0.0174
Mean of Detected Data	0.0504
Median of Detected Data	0.0457
Variance of Detected Data	0.00113
SD of Detected Data	0.0336
CV of Detected Data	0.665
Skewness of Detected Data	0.622
Mean of Detected log data	-3.158
SD of Detected Log data	0.745

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0253
SD	0.0169
Standard Error of Mean	0.00518
95% KM (t) UCL	0.0344
95% KM (z) UCL	0.0338
95% KM (BCA) UCL	0.0861
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0479

97.5% KM (Chebyshev) UCL	0.0577
99% KM (Chebyshev) UCL	0.0769

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0138**
[per recommendation in ProUCL User Guide]

Chloroform

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.00504
Maximum Detected	0.00527
Percent Non-Detects	**87.50%**
Minimum Non-detect	2.28E-04
Maximum Non-detect	0.00108

Mean of Detected Data	0.00516
Median of Detected Data	0.00516
Variance of Detected Data	2.65E-08
SD of Detected Data	1.63E-04
CV of Detected Data	0.0315
Skewness of Detected Data	N/A
Mean of Detected log data	-5.268
SD of Detected Log data	0.0316

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00505
SD	5.57E-05
Standard Error of Mean	1.97E-05
95% KM (t) UCL	0.00509
95% KM (z) UCL	0.00509
95% KM (BCA) UCL	0.00527
95% KM (Percentile Bootstrap) UCL	0.00527
95% KM (Chebyshev) UCL	0.00514
97.5% KM (Chebyshev) UCL	0.00518

99% KM (Chebyshev) UCL	0.00525
Potential UCL to Use	
95% KM (t) UCL	0.00509
95% KM (% Bootstrap) UCL	0.00527
**** Instead of UCL, EPC is selected to be median =**	**<0.000442**
[per recommendation in ProUCL User Guide]	

Chromium

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	5.01
Maximum	14.4
Mean	9.214
Median	10.19
SD	2.644
Variance	6.989
Coefficient of Variation	0.287
Skewness	-0.17
Mean of log data	2.177
SD of log data	0.314
95% Useful UCLs	
Student's-t UCL	**10.37**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	10.27
95% Modified-t UCL	10.37
Non-Parametric UCLs	
95% CLT UCL	10.3
95% Jackknife UCL	10.37
95% Standard Bootstrap UCL	10.29
95% Bootstrap-t UCL	10.31
95% Hall's Bootstrap UCL	10.31
95% Percentile Bootstrap UCL	10.29
95% BCA Bootstrap UCL	10.16
95% Chebyshev(Mean, Sd) UCL	12.09
97.5% Chebyshev(Mean, Sd) UCL	13.34
99% Chebyshev(Mean, Sd) UCL	15.79

Data appear Normal (0.05)
May want to try Normal UCLs

Chrysene

Total Number of Data	16
Number of Non-Detect Data	6
Number of Detected Data	**10**
Minimum Detected	0.0137
Maximum Detected	0.475
Percent Non-Detects	**37.50%**
Minimum Non-detect	0.0109
Maximum Non-detect	0.0151
Mean of Detected Data	0.12
Median of Detected Data	0.0825
Variance of Detected Data	0.0196

SD of Detected Data	0.14
CV of Detected Data	1.166
Skewness of Detected Data	2.074
Mean of Detected log data	-2.711
SD of Detected Log data	1.199

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	8
Number treated as Detected	8
Single DL Percent Detection	50.00%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0803
SD	0.117
Standard Error of Mean	0.0308
95% KM (t) UCL	0.134
95% KM (z) UCL	0.131
95% KM (BCA) UCL	0.141
95% KM (Percentile Bootstrap) UCL	0.135
95% KM (Chebyshev) UCL	0.215
97.5% KM (Chebyshev) UCL	**0.273**
99% KM (Chebyshev) UCL	0.387

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Cobalt

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	3.05
Maximum	7.16
Mean	4.385
Median	4.06
SD	1.131
Variance	1.279
Coefficient of Variation	0.258
Skewness	0.956
Mean of log data	1.449
SD of log data	0.245

95% Useful UCLs	
Student's-t UCL	**4.881**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	4.922
95% Modified-t UCL	4.892
Non-Parametric UCLs	
95% CLT UCL	4.85
95% Jackknife UCL	4.881
95% Standard Bootstrap UCL	4.83
95% Bootstrap-t UCL	4.957
95% Hall's Bootstrap UCL	5.007
95% Percentile Bootstrap UCL	4.847

95% BCA Bootstrap UCL	4.876
95% Chebyshev(Mean, Sd) UCL	5.618
97.5% Chebyshev(Mean, Sd) UCL	6.151
99% Chebyshev(Mean, Sd) UCL	7.198

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	3.28
Maximum	12.6
Mean	7.112
Median	6.655
SD	2.997
Variance	8.98
Coefficient of Variation	0.421
Skewness	0.299
Mean of log data	1.87
SD of log data	0.456
95% Useful UCLs	
Student's-t UCL	**8.425**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	8.404
95% Modified-t UCL	8.435
Non-Parametric UCLs	
95% CLT UCL	8.344
95% Jackknife UCL	8.425
95% Standard Bootstrap UCL	8.306
95% Bootstrap-t UCL	8.514
95% Hall's Bootstrap UCL	8.371
95% Percentile Bootstrap UCL	8.295
95% BCA Bootstrap UCL	8.335
95% Chebyshev(Mean, Sd) UCL	10.38
97.5% Chebyshev(Mean, Sd) UCL	11.79
99% Chebyshev(Mean, Sd) UCL	14.57

Data appear Normal (0.05)
May want to try Normal UCLs

Cyclohexane

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.00192
Maximum Detected	0.00912
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.00179
Maximum Non-detect	0.00851

Data set has all detected values equal to = 0.00192, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00192

**** Instead of UCL, EPC is selected to be median = <0.00329**
[per recommendation in ProUCL User Guide]

Dibenz(a,h)anthracene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0511
Maximum Detected	0.235
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0118
Maximum Non-detect	0.0168
Mean of Detected Data	0.105
Median of Detected Data	0.0659
Variance of Detected Data	0.00541
SD of Detected Data	0.0735
CV of Detected Data	0.701
Skewness of Detected Data	1.464
Mean of Detected log data	-2.428
SD of Detected Log data	0.612

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0712
SD	0.0486
Standard Error of Mean	0.0133
95% KM (t) UCL	0.0946
95% KM (z) UCL	0.0932
95% KM (BCA) UCL	0.111
95% KM (Percentile Bootstrap) UCL	0.0989
95% KM (Chebyshev) UCL	0.129
97.5% KM (Chebyshev) UCL	0.154
99% KM (Chebyshev) UCL	0.204

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median = <0.0157**
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**

Minimum Detected	0.0268
Maximum Detected	0.0305
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.0173
Maximum Non-detect	0.025
Mean of Detected Data	0.0287
Median of Detected Data	0.0287
Variance of Detected Data	6.85E-06
SD of Detected Data	0.00262
CV of Detected Data	0.0913
Skewness of Detected Data	N/A
Mean of Detected log data	-3.555
SD of Detected Log data	0.0914

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.027
SD	8.96E-04
Standard Error of Mean	3.17E-04
95% KM (t) UCL	0.0276
95% KM (z) UCL	0.0276
95% KM (BCA) UCL	0.0305
95% KM (Percentile Bootstrap) UCL	0.0305
95% KM (Chebyshev) UCL	0.0284
97.5% KM (Chebyshev) UCL	0.029
99% KM (Chebyshev) UCL	0.0302
Potential UCL to Use	
95% KM (t) UCL	0.0276
95% KM (% Bootstrap) UCL	0.0305
**** Instead of UCL, EPC is selected to be median = [per recommendation in ProUCL User Guide]**	**<0.0192**

Diethyl phthalate

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**

Minimum Detected	0.0389
Maximum Detected	0.0389
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0208
Maximum Non-detect	0.03

Data set has all detected values equal to = 0.0389, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0389

**** Instead of UCL, EPC is selected to be median = <0.0224**
[per recommendation in ProUCL User Guide]

Di-n-octyl phthalate

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.0147
Maximum Detected	0.192
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.0102
Maximum Non-detect	0.0147

Mean of Detected Data	0.103
Median of Detected Data	0.103
Variance of Detected Data	0.0157
SD of Detected Data	0.125
CV of Detected Data	1.213
Skewness of Detected Data	N/A
Mean of Detected log data	-2.935
SD of Detected Log data	1.817

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.0258
SD	0.0429
Standard Error of Mean	0.0152
95% KM (t) UCL	0.0524

95% KM (z) UCL	0.0507
95% KM (BCA) UCL	0.192
95% KM (Percentile Bootstrap) UCL	0.192
95% KM (Chebyshev) UCL	0.0919
97.5% KM (Chebyshev) UCL	0.121
99% KM (Chebyshev) UCL	0.177

Potential UCL to Use

**** Instead of UCL, EPC is selected to be median = <0.0113**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	16
Number of Non-Detect Data	8
Number of Detected Data	**8**
Minimum Detected	0.0222
Maximum Detected	0.804
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.0137
Maximum Non-detect	0.0196
Mean of Detected Data	0.218
Median of Detected Data	0.161
Variance of Detected Data	0.0618
SD of Detected Data	0.249
CV of Detected Data	1.143
Skewness of Detected Data	2.315
Mean of Detected log data	-2.036
SD of Detected Log data	1.143

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.12
SD	0.191
Standard Error of Mean	0.0511
95% KM (t) UCL	0.209
95% KM (z) UCL	0.204
95% KM (BCA) UCL	0.251
95% KM (Percentile Bootstrap) UCL	0.223
95% KM (Chebyshev) UCL	0.343
97.5% KM (Chebyshev) UCL	**0.439**
99% KM (Chebyshev) UCL	0.628

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Fluorene

Total Number of Data	16
Number of Non-Detect Data	12
Number of Detected Data	**4**
Minimum Detected	0.0124
Maximum Detected	0.046
Percent Non-Detects	**75.00%**
Minimum Non-detect	0.012
Maximum Non-detect	0.0173

Mean of Detected Data	0.0276
Median of Detected Data	0.0259
Variance of Detected Data	1.94E-04
SD of Detected Data	0.0139
CV of Detected Data	0.506
Skewness of Detected Data	0.682
Mean of Detected log data	-3.695
SD of Detected Log data	0.54

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	13
Number treated as Detected	3
Single DL Percent Detection	81.25%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0162
SD	0.00891
Standard Error of Mean	0.00257
95% KM (t) UCL	0.0207
95% KM (z) UCL	0.0204
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.03
95% KM (Chebyshev) UCL	0.0274
97.5% KM (Chebyshev) UCL	0.0323
99% KM (Chebyshev) UCL	0.0418

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0138**
[per recommendation in ProUCL User Guide]

gamma-Chlordane

Total Number of Data	16
Number of Non-Detect Data	12

Number of Detected Data	**4**
Minimum Detected	6.38E-04
Maximum Detected	8.26E-04
Percent Non-Detects	**75.00%**
Minimum Non-detect	3.19E-04
Maximum Non-detect	4.51E-04
Mean of Detected Data	7.02E-04
Median of Detected Data	6.72E-04
Variance of Detected Data	7.22E-09
SD of Detected Data	8.50E-05
CV of Detected Data	0.121
Skewness of Detected Data	1.69
Mean of Detected log data	-7.267
SD of Detected Log data	0.116

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	6.54E-04
SD	4.61E-05
Standard Error of Mean	1.33E-05
95% KM (t) UCL	6.77E-04
95% KM (z) UCL	6.76E-04
95% KM (BCA) UCL	8.26E-04
95% KM (Percentile Bootstrap) UCL	7.04E-04
95% KM (Chebyshev) UCL	7.12E-04
97.5% KM (Chebyshev) UCL	7.37E-04
99% KM (Chebyshev) UCL	7.86E-04

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.000391**
[per recommendation in ProUCL User Guide]

Hexachlorobenzene

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0319
Maximum Detected	0.0319
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.015
Maximum Non-detect	0.0217

Data set has all detected values equal to = 0.0319, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects

Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0319

** **Instead of UCL, EPC is selected to be median =**	**<0.0162**
[per recommendation in ProUCL User Guide]	

Indeno(1,2,3-cd)pyrene

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.0556
Maximum Detected	0.405
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.0198
Maximum Non-detect	0.0282
Mean of Detected Data	0.174
Median of Detected Data	0.147
Variance of Detected Data	0.0169
SD of Detected Data	0.13
CV of Detected Data	0.747
Skewness of Detected Data	1.29
Mean of Detected log data	-1.976
SD of Detected Log data	0.739

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0999
SD	0.0925
Standard Error of Mean	0.0253
95% KM (t) UCL	0.144
95% KM (z) UCL	0.142
95% KM (BCA) UCL	0.225
95% KM (Percentile Bootstrap) UCL	0.167
95% KM (Chebyshev) UCL	0.21
97.5% KM (Chebyshev) UCL	0.258
99% KM (Chebyshev) UCL	0.352

Data appear Normal (0.05)
May want to try Normal UCLs

** **Instead of UCL, EPC is selected to be median =**	**<0.0253**
[per recommendation in ProUCL User Guide]	

Iron

Number of Valid Observations	16

Number of Distinct Observations	16
Minimum	6750
Maximum	28200
Mean	13352
Median	13200
SD	5546
Variance	30754190
Coefficient of Variation	0.415
Skewness	1.341
Mean of log data	9.427
SD of log data	0.389
95% Useful UCLs	
Student's-t UCL	15782
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16129
95% Modified-t UCL	15860
Non-Parametric UCLs	
95% CLT UCL	15632
95% Jackknife UCL	15782
95% Standard Bootstrap UCL	15594
95% Bootstrap-t UCL	16690
95% Hall's Bootstrap UCL	18534
95% Percentile Bootstrap UCL	15569
95% BCA Bootstrap UCL	16013
95% Chebyshev(Mean, Sd) UCL	19395
97.5% Chebyshev(Mean, Sd) UCL	**22010**
99% Chebyshev(Mean, Sd) UCL	27146

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Isopropylbenzene (Cumene)

Total Number of Data	16
Number of Non-Detect Data	14
Number of Detected Data	**2**
Minimum Detected	0.00464
Maximum Detected	0.00704
Percent Non-Detects	**87.50%**
Minimum Non-detect	2.48E-04
Maximum Non-detect	0.00118
Mean of Detected Data	0.00584
Median of Detected Data	0.00584
Variance of Detected Data	2.88E-06
SD of Detected Data	0.0017
CV of Detected Data	0.291
Skewness of Detected Data	N/A
Mean of Detected log data	-5.165
SD of Detected Log data	0.295

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00479
SD	5.81E-04
Standard Error of Mean	2.05E-04
95% KM (t) UCL	0.00515
95% KM (z) UCL	0.00513
95% KM (BCA) UCL	0.00704
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00569
97.5% KM (Chebyshev) UCL	0.00607
99% KM (Chebyshev) UCL	0.00683
Potential UCL to Use	
95% KM (t) UCL	0.00515
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.000480**
[per recommendation in ProUCL User Guide]

Lead

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	5
Maximum	32.3
Mean	11.56
Median	10.03
SD	7.161
Variance	51.28
Coefficient of Variation	0.62
Skewness	2.013
Mean of log data	2.311
SD of log data	0.512
95% Useful UCLs	
Student's-t UCL	14.69
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.46
95% Modified-t UCL	14.84
Non-Parametric UCLs	
95% CLT UCL	14.5
95% Jackknife UCL	14.69
95% Standard Bootstrap UCL	14.34
95% Bootstrap-t UCL	18.14
95% Hall's Bootstrap UCL	31.58

95% Percentile Bootstrap UCL	14.62
95% BCA Bootstrap UCL	15.47
95% Chebyshev(Mean, Sd) UCL	19.36
97.5% Chebyshev(Mean, Sd) UCL	**22.74**
99% Chebyshev(Mean, Sd) UCL	29.37

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Lithium

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	6.4
Maximum	20
Mean	10.53
Median	9.88
SD	3.559
Variance	12.67
Coefficient of Variation	0.338
Skewness	1.247
Mean of log data	2.306
SD of log data	0.314

95% Useful UCLs	
Student's-t UCL	**12.09**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	12.29
95% Modified-t UCL	12.14
Non-Parametric UCLs	
95% CLT UCL	12
95% Jackknife UCL	12.09
95% Standard Bootstrap UCL	11.96
95% Bootstrap-t UCL	12.73
95% Hall's Bootstrap UCL	12.79
95% Percentile Bootstrap UCL	12.04
95% BCA Bootstrap UCL	12.17
95% Chebyshev(Mean, Sd) UCL	14.41
97.5% Chebyshev(Mean, Sd) UCL	16.09
99% Chebyshev(Mean, Sd) UCL	19.39

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	192
Maximum	474
Mean	283.3
Median	275
SD	87.59
Variance	7673
Coefficient of Variation	0.309
Skewness	0.667
Mean of log data	5.603
SD of log data	0.301

95% Useful UCLs	
Student's-t UCL	**321.6**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	323.2
95% Modified-t UCL	322.2
Non-Parametric UCLs	
95% CLT UCL	319.3
95% Jackknife UCL	321.6
95% Standard Bootstrap UCL	317.6
95% Bootstrap-t UCL	331.6
95% Hall's Bootstrap UCL	322.6
95% Percentile Bootstrap UCL	322.1
95% BCA Bootstrap UCL	324
95% Chebyshev(Mean, Sd) UCL	378.7
97.5% Chebyshev(Mean, Sd) UCL	420
99% Chebyshev(Mean, Sd) UCL	501.1

Data appear Normal (0.05)
May want to try Normal UCLs

Mercury

Number of Valid Observations	16
Number of Distinct Observations	13
Minimum	0.011
Maximum	0.036
Mean	0.0201
Median	0.02
SD	0.00739
Variance	5.46E-05
Coefficient of Variation	0.368
Skewness	0.618
Mean of log data	-3.972
SD of log data	0.367
95% Useful UCLs	
Student's-t UCL	**0.0233**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.0234
95% Modified-t UCL	0.0233
Non-Parametric UCLs	
95% CLT UCL	0.0231
95% Jackknife UCL	0.0233
95% Standard Bootstrap UCL	0.023
95% Bootstrap-t UCL	0.0236
95% Hall's Bootstrap UCL	0.0236
95% Percentile Bootstrap UCL	0.0231
95% BCA Bootstrap UCL	0.023
95% Chebyshev(Mean, Sd) UCL	0.0281
97.5% Chebyshev(Mean, Sd) UCL	0.0316
99% Chebyshev(Mean, Sd) UCL	0.0384

Data appear Normal (0.05)
May want to try Normal UCLs

Methylcyclohexane

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0037
Maximum Detected	0.0037
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.000599
Maximum Non-detect	0.00285

Data set has all detected values equal to = 0.0037, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0037

**** Instead of UCL, EPC is selected to be median = <0.00117**
[per recommendation in ProUCL User Guide]

Molybdenum

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	0.14
Maximum	5.66
Mean	0.667
Median	0.24
SD	1.358
Variance	1.843
Coefficient of Variation	2.036
Skewness	3.761
Mean of log data	-1.108
SD of log data	0.95

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	1.262
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	1.566
95% Modified-t UCL	1.315
Non-Parametric UCLs	
95% CLT UCL	1.225
95% Jackknife UCL	1.262
95% Standard Bootstrap UCL	1.206
95% Bootstrap-t UCL	4.6
95% Hall's Bootstrap UCL	3.351
95% Percentile Bootstrap UCL	1.312
95% BCA Bootstrap UCL	1.703
95% Chebyshev(Mean, Sd) UCL	2.146
97.5% Chebyshev(Mean, Sd) UCL	2.786
99% Chebyshev(Mean, Sd) UCL	4.044

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **2.146**

Nickel

Number of Valid Observations	16
Number of Distinct Observations	15

Minimum	5.8
Maximum	16.7
Mean	9.589
Median	9.93
SD	2.741
Variance	7.512
Coefficient of Variation	0.286
Skewness	0.821
Mean of log data	2.223
SD of log data	0.283

95% Useful UCLs	
Student's-t UCL	**10.79**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	10.87
95% Modified-t UCL	10.81

Non-Parametric UCLs	
95% CLT UCL	10.72
95% Jackknife UCL	10.79
95% Standard Bootstrap UCL	10.68
95% Bootstrap-t UCL	10.9
95% Hall's Bootstrap UCL	11.23
95% Percentile Bootstrap UCL	10.74
95% BCA Bootstrap UCL	10.87
95% Chebyshev(Mean, Sd) UCL	12.58
97.5% Chebyshev(Mean, Sd) UCL	13.87
99% Chebyshev(Mean, Sd) UCL	16.41

Data appear Normal (0.05)
May want to try Normal UCLs

n-Nitrosodiphenylamine

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.0434
Maximum Detected	0.0434
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.0139
Maximum Non-detect	0.0201

Data set has all detected values equal to = 0.0434, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0434

**** Instead of UCL, EPC is selected to be median = <0.0150**
[per recommendation in ProUCL User Guide]

Phenanthrene

Total Number of Data	16
Number of Non-Detect Data	8
Number of Detected Data	**8**
Minimum Detected	0.0311
Maximum Detected	0.508
Percent Non-Detects	**50.00%**

Minimum Non-detect	0.0152
Maximum Non-detect	0.0216
Mean of Detected Data	0.14
Median of Detected Data	0.0953
Variance of Detected Data	0.0242
SD of Detected Data	0.155
CV of Detected Data	1.107
Skewness of Detected Data	2.358
Mean of Detected log data	-2.349
SD of Detected Log data	0.892

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0858
SD	0.116
Standard Error of Mean	0.0311
95% KM (t) UCL	0.14
95% KM (z) UCL	0.137
95% KM (BCA) UCL	0.159
95% KM (Percentile Bootstrap) UCL	0.142
95% KM (Chebyshev) UCL	0.221
97.5% KM (Chebyshev) UCL	**0.28**
99% KM (Chebyshev) UCL	0.396

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Pyrene

Total Number of Data	16
Number of Non-Detect Data	6
Number of Detected Data	**10**
Minimum Detected	0.0176
Maximum Detected	0.862
Percent Non-Detects	**37.50%**
Minimum Non-detect	0.0146
Maximum Non-detect	0.0202
Mean of Detected Data	0.203
Median of Detected Data	0.146
Variance of Detected Data	0.0652
SD of Detected Data	0.255
CV of Detected Data	1.258
Skewness of Detected Data	2.208
Mean of Detected log data	-2.308
SD of Detected Log data	1.341

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	7
Number treated as Detected	9
Single DL Percent Detection	43.75%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.133
SD	0.211
Standard Error of Mean	0.0557
95% KM (t) UCL	0.231
95% KM (z) UCL	0.225
95% KM (BCA) UCL	0.248
95% KM (Percentile Bootstrap) UCL	0.231
95% KM (Chebyshev) UCL	0.376
97.5% KM (Chebyshev) UCL	**0.482**
99% KM (Chebyshev) UCL	0.688

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Silver

Total Number of Data	16
Number of Non-Detect Data	10
Number of Detected Data	**6**
Minimum Detected	0.3
Maximum Detected	0.54
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.067
Maximum Non-detect	0.094
Mean of Detected Data	0.393
Median of Detected Data	0.39
Variance of Detected Data	0.00695
SD of Detected Data	0.0833
CV of Detected Data	0.212
Skewness of Detected Data	1.083
Mean of Detected log data	-0.951
SD of Detected Log data	0.203

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.335

SD	0.0649
Standard Error of Mean	0.0178
95% KM (t) UCL	0.366
95% KM (z) UCL	0.364
95% KM (BCA) UCL	0.418
95% KM (Percentile Bootstrap) UCL	0.401
95% KM (Chebyshev) UCL	0.412
97.5% KM (Chebyshev) UCL	0.446
99% KM (Chebyshev) UCL	0.512

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0895**
[per recommendation in ProUCL User Guide]

Strontium

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	32.8
Maximum	81.7
Mean	44.86
Median	39.85
SD	14.43
Variance	208.3
Coefficient of Variation	0.322
Skewness	1.805
Mean of log data	3.765
SD of log data	0.274

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	51.19
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	52.54
95% Modified-t UCL	51.46
Non-Parametric UCLs	
95% CLT UCL	50.8
95% Jackknife UCL	51.19
95% Standard Bootstrap UCL	50.5
95% Bootstrap-t UCL	56.98
95% Hall's Bootstrap UCL	82.31
95% Percentile Bootstrap UCL	51.29
95% BCA Bootstrap UCL	51.61
95% Chebyshev(Mean, Sd) UCL	60.59
97.5% Chebyshev(Mean, Sd) UCL	67.4
99% Chebyshev(Mean, Sd) UCL	80.77

Potential UCL to Use

Use 95% Student's-t UCL	51.19
Or 95% Modified-t UCL	**51.46**

Titanium

Number of Valid Observations	16
Number of Distinct Observations	16

Minimum	19.1
Maximum	36.6
Mean	25.58
Median	23.95
SD	5.051
Variance	25.51
Coefficient of Variation	0.198
Skewness	1.084
Mean of log data	3.225
SD of log data	0.186

95% Useful UCLs	
Student's-t UCL	**27.79**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	28.02
95% Modified-t UCL	27.85
Non-Parametric UCLs	
95% CLT UCL	27.65
95% Jackknife UCL	27.79
95% Standard Bootstrap UCL	27.55
95% Bootstrap-t UCL	28.62
95% Hall's Bootstrap UCL	28.98
95% Percentile Bootstrap UCL	27.63
95% BCA Bootstrap UCL	27.97
95% Chebyshev(Mean, Sd) UCL	31.08
97.5% Chebyshev(Mean, Sd) UCL	33.46
99% Chebyshev(Mean, Sd) UCL	38.14

Data appear Normal (0.05)
May want to try Normal UCLs

Toluene

Total Number of Data	16
Number of Non-Detect Data	15
Number of Detected Data	**1**
Minimum Detected	0.00581
Maximum Detected	0.00581
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.00089
Maximum Non-detect	0.00423

Data set has all detected values equal to = 0.00581, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00581

**** Instead of UCL, EPC is selected to be median = <0.00173**
[per recommendation in ProUCL User Guide]

Vanadium

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	9.06
Maximum	21.2
Mean	13.86
Median	13.45

SD	3.523
Variance	12.41
Coefficient of Variation	0.254
Skewness	0.54
Mean of log data	2.599
SD of log data	0.251
95% Useful UCLs	
Student's-t UCL	**15.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.44
95% Modified-t UCL	15.42
Non-Parametric UCLs	
95% CLT UCL	15.31
95% Jackknife UCL	15.4
95% Standard Bootstrap UCL	15.23
95% Bootstrap-t UCL	15.63
95% Hall's Bootstrap UCL	15.38
95% Percentile Bootstrap UCL	15.29
95% BCA Bootstrap UCL	15.37
95% Chebyshev(Mean, Sd) UCL	17.7
97.5% Chebyshev(Mean, Sd) UCL	19.36
99% Chebyshev(Mean, Sd) UCL	22.62

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	16
Number of Distinct Observations	15
Minimum	18
Maximum	92.6
Mean	45.36
Median	43.6
SD	19.88
Variance	395.3
Coefficient of Variation	0.438
Skewness	0.681
Mean of log data	3.722
SD of log data	0.454
95% Useful UCLs	
Student's-t UCL	**54.07**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	54.44
95% Modified-t UCL	54.21
Non-Parametric UCLs	
95% CLT UCL	53.53
95% Jackknife UCL	54.07
95% Standard Bootstrap UCL	53.02
95% Bootstrap-t UCL	55.22
95% Hall's Bootstrap UCL	55.11
95% Percentile Bootstrap UCL	53.7
95% BCA Bootstrap UCL	54.66
95% Chebyshev(Mean, Sd) UCL	67.02
97.5% Chebyshev(Mean, Sd) UCL	76.4
99% Chebyshev(Mean, Sd) UCL	94.81

Data appear Normal (0.05)
May want to try Normal UCLs

APPENDIX A-7

BACKGROUND SEDIMENT INTERCOASTAL WATERWAY

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . . \ProUCL data analysis\ICWsed - JUST BACKGROUND\ICWsed data - JUST BACKGROUND_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,4-Trimethylbenzene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00391
Maximum Detected	0.00391
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00032
Maximum Non-detect	0.00308

Data set has all detected values equal to = 0.00391, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00391

**** Instead of UCL, EPC is selected to be median = <0.000724**
[per recommendation in ProUCL User Guide]

1,4-Dichlorobenzene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00411
Maximum Detected	0.00411
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.000681
Maximum Non-detect	0.00352

Data set has all detected values equal to = 0.00411, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00411

**** Instead of UCL, EPC is selected to be median = <0.00154**
[per recommendation in ProUCL User Guide]

2-Butanone

Total Number of Data	9
Number of Non-Detect Data	7
Number of Detected Data	**2**
Minimum Detected	0.002
Maximum Detected	0.00216
Percent Non-Detects	**77.78%**
Minimum Non-detect	5.05E-04
Maximum Non-detect	0.00486
Mean of Detected Data	0.00208
Median of Detected Data	0.00208

Variance of Detected Data	1.28E-08
SD of Detected Data	1.13E-04
CV of Detected Data	0.0544
Skewness of Detected Data	N/A
Mean of Detected log data	-6.176
SD of Detected Log data	0.0544

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	9
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00203
SD	5.96E-05
Standard Error of Mean	3.44E-05
95% KM (t) UCL	0.00209
95% KM (z) UCL	0.00208
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.00216
95% KM (Chebyshev) UCL	0.00218
97.5% KM (Chebyshev) UCL	0.00224
99% KM (Chebyshev) UCL	0.00237

Potential UCL to Use	
95% KM (t) UCL	0.00209
95% KM (% Bootstrap) UCL	0.00216

**** Instead of UCL, EPC is selected to be median = <0.00200**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00057
Maximum Detected	0.00057
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00018

Maximum Non-detect	0.00023

Data set has all detected values equal to = 5.7000E-4, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00057

**** Instead of UCL, EPC is selected to be median = <0.00021**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	4730
Maximum	21800
Mean	12213
Median	10800
SD	6892
Variance	47504575
Coefficient of Variation	0.564
Skewness	0.403
Mean of log data	9.255
SD of log data	0.604

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**16486**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16322
95% Modified-t UCL	16537
Non-Parametric UCLs	
95% CLT UCL	15992
95% Jackknife UCL	16486
95% Standard Bootstrap UCL	15840
95% Bootstrap-t UCL	16940
95% Hall's Bootstrap UCL	15693
95% Percentile Bootstrap UCL	15956
95% BCA Bootstrap UCL	15922
95% Chebyshev(Mean, Sd) UCL	22228
97.5% Chebyshev(Mean, Sd) UCL	26561
99% Chebyshev(Mean, Sd) UCL	35073

Data appear Normal (0.05)
May want to try Normal UCLs

Antimony

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	1.68
Maximum	7.33
Mean	4.023

Median	2.83
SD	2.215
Variance	4.905
Coefficient of Variation	0.55
Skewness	0.488
Mean of log data	1.251
SD of log data	0.568

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**5.396**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	5.366
95% Modified-t UCL	5.416
Non-Parametric UCLs	
95% CLT UCL	5.238
95% Jackknife UCL	5.396
95% Standard Bootstrap UCL	5.197
95% Bootstrap-t UCL	5.622
95% Hall's Bootstrap UCL	5.022
95% Percentile Bootstrap UCL	5.148
95% BCA Bootstrap UCL	5.33
95% Chebyshev(Mean, Sd) UCL	7.241
97.5% Chebyshev(Mean, Sd) UCL	8.634
99% Chebyshev(Mean, Sd) UCL	11.37

Data appear Normal (0.05)
May want to try Normal UCLs

Arsenic

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	2.36
Maximum	9.62
Mean	5.813
Median	4.63
SD	3.107
Variance	9.653
Coefficient of Variation	0.534
Skewness	0.351
Mean of log data	1.623
SD of log data	0.566

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**7.739**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7.646

95% Modified-t UCL	7.759
Non-Parametric UCLs	
95% CLT UCL	7.517
95% Jackknife UCL	7.739
95% Standard Bootstrap UCL	7.405
95% Bootstrap-t UCL	8.015
95% Hall's Bootstrap UCL	7.142
95% Percentile Bootstrap UCL	7.431
95% BCA Bootstrap UCL	7.597
95% Chebyshev(Mean, Sd) UCL	10.33
97.5% Chebyshev(Mean, Sd) UCL	12.28
99% Chebyshev(Mean, Sd) UCL	16.12

Data appear Normal (0.05)
May want to try Normal UCLs

Barium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	111
Maximum	280
Mean	209.7
Median	201
SD	47.73
Variance	2278
Coefficient of Variation	0.228
Skewness	-0.775
Mean of log data	5.318
SD of log data	0.263

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**239.2**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	231.4
95% Modified-t UCL	238.6
Non-Parametric UCLs	
95% CLT UCL	235.8
95% Jackknife UCL	239.2
95% Standard Bootstrap UCL	234.1
95% Bootstrap-t UCL	235.4
95% Hall's Bootstrap UCL	235.3
95% Percentile Bootstrap UCL	233.7
95% BCA Bootstrap UCL	231.4
95% Chebyshev(Mean, Sd) UCL	279
97.5% Chebyshev(Mean, Sd) UCL	309
99% Chebyshev(Mean, Sd) UCL	368

Data appear Normal (0.05)
May want to try Normal UCLs

Benzo(b)fluoranthene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.0369
Maximum Detected	0.0369
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.00909
Maximum Non-detect	0.0115

Data set has all detected values equal to = 0.0369, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0369

**** Instead of UCL, EPC is selected to be median = <0.0109**
[per recommendation in ProUCL User Guide]

Beryllium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	0.32
Maximum	1.32
Mean	0.766
Median	0.69
SD	0.403
Variance	0.163
Coefficient of Variation	0.527
Skewness	0.315
Mean of log data	-0.403
SD of log data	0.566

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**1.016**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	1.002
95% Modified-t UCL	1.018
Non-Parametric UCLs	
95% CLT UCL	0.987
95% Jackknife UCL	1.016
95% Standard Bootstrap UCL	0.975
95% Bootstrap-t UCL	1.053
95% Hall's Bootstrap UCL	0.946
95% Percentile Bootstrap UCL	0.977
95% BCA Bootstrap UCL	0.981
95% Chebyshev(Mean, Sd) UCL	1.351
97.5% Chebyshev(Mean, Sd) UCL	1.605
99% Chebyshev(Mean, Sd) UCL	2.103

Data appear Normal (0.05)
May want to try Normal UCLs

Boron

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	13.3
Maximum	47.9
Mean	27.64
Median	26
SD	12.82
Variance	164.2
Coefficient of Variation	0.464
Skewness	0.532
Mean of log data	3.222
SD of log data	0.472

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**35.59**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	35.48
95% Modified-t UCL	35.71
Non-Parametric UCLs	
95% CLT UCL	34.67
95% Jackknife UCL	35.59
95% Standard Bootstrap UCL	34.23
95% Bootstrap-t UCL	36.73
95% Hall's Bootstrap UCL	35.45
95% Percentile Bootstrap UCL	34.46
95% BCA Bootstrap UCL	35.3
95% Chebyshev(Mean, Sd) UCL	46.26
97.5% Chebyshev(Mean, Sd) UCL	54.32
99% Chebyshev(Mean, Sd) UCL	70.15

Data appear Normal (0.05)
May want to try Normal UCLs

Carbon disulfide

Total Number of Data	9
Number of Non-Detect Data	7
Number of Detected Data	**2**
Minimum Detected	0.00341
Maximum Detected	0.00841
Percent Non-Detects	**77.78%**
Minimum Non-detect	1.76E-04
Maximum Non-detect	0.0017
Mean of Detected Data	0.00591
Median of Detected Data	0.00591
Variance of Detected Data	1.25E-05
SD of Detected Data	0.00354
CV of Detected Data	0.598

Skewness of Detected Data	N/A
Mean of Detected log data	-5.23
SD of Detected Log data	0.638

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00397
SD	0.00157
Standard Error of Mean	7.41E-04
95% KM (t) UCL	0.00534
95% KM (z) UCL	0.00518
95% KM (BCA) UCL	0.00841
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00719
97.5% KM (Chebyshev) UCL	0.00859
99% KM (Chebyshev) UCL	0.0113

Potential UCL to Use	
95% KM (t) UCL	0.00534
95% KM (% Bootstrap) UCL	N/A

**** Instead of UCL, EPC is selected to be median = <0.000810**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	5.81
Maximum	22.5
Mean	12.81
Median	11.1
SD	6.512
Variance	42.41
Coefficient of Variation	0.508
Skewness	0.444
Mean of log data	2.43
SD of log data	0.527

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**16.85**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.73
95% Modified-t UCL	16.9
Non-Parametric UCLs	
95% CLT UCL	16.38
95% Jackknife UCL	16.85
95% Standard Bootstrap UCL	16.23
95% Bootstrap-t UCL	17.33
95% Hall's Bootstrap UCL	16.09
95% Percentile Bootstrap UCL	16.17
95% BCA Bootstrap UCL	16.4
95% Chebyshev(Mean, Sd) UCL	22.28
97.5% Chebyshev(Mean, Sd) UCL	26.37
99% Chebyshev(Mean, Sd) UCL	34.41

Data appear Normal (0.05)
May want to try Normal UCLs

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cis-1,2-Dichloroethene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	1
Minimum Detected	0.0284
Maximum Detected	0.0284
Percent Non-Detects	88.89%
Minimum Non-detect	0.000204
Maximum Non-detect	0.00196

Data set has all detected values equal to = 0.0284, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0284

**** Instead of UCL, EPC is selected to be median = <0.000461**
[per recommendation in ProUCL User Guide]

Cobalt

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	3.32
Maximum	11.8
Mean	6.698
Median	5.92
SD	3.165
Variance	10.02
Coefficient of Variation	0.473
Skewness	0.508
Mean of log data	1.8

SD of log data	0.481

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**8.66**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	8.624
95% Modified-t UCL	8.69
Non-Parametric UCLs	
95% CLT UCL	8.433
95% Jackknife UCL	8.66
95% Standard Bootstrap UCL	8.334
95% Bootstrap-t UCL	8.982
95% Hall's Bootstrap UCL	8.445
95% Percentile Bootstrap UCL	8.349
95% BCA Bootstrap UCL	8.547
95% Chebyshev(Mean, Sd) UCL	11.3
97.5% Chebyshev(Mean, Sd) UCL	13.29
99% Chebyshev(Mean, Sd) UCL	17.2

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	2.68
Maximum	16.8
Mean	8.138
Median	6.87
SD	5.165
Variance	26.67
Coefficient of Variation	0.635
Skewness	0.626
Mean of log data	1.902
SD of log data	0.676

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**11.34**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	11.35
95% Modified-t UCL	11.4
Non-Parametric UCLs	
95% CLT UCL	10.97
95% Jackknife UCL	11.34
95% Standard Bootstrap UCL	10.78

95% Bootstrap-t UCL	11.68
95% Hall's Bootstrap UCL	11.18
95% Percentile Bootstrap UCL	11.05
95% BCA Bootstrap UCL	11.25
95% Chebyshev(Mean, Sd) UCL	15.64
97.5% Chebyshev(Mean, Sd) UCL	18.89
99% Chebyshev(Mean, Sd) UCL	25.27

Data appear Normal (0.05)
May want to try Normal UCLs

Iron

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	7440
Maximum	27900
Mean	16496
Median	15000
SD	8097
Variance	65563178
Coefficient of Variation	0.491
Skewness	0.325
Mean of log data	9.596
SD of log data	0.518

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**21515**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	21247
95% Modified-t UCL	21563
Non-Parametric UCLs	
95% CLT UCL	20935
95% Jackknife UCL	21515
95% Standard Bootstrap UCL	20708
95% Bootstrap-t UCL	22126
95% Hall's Bootstrap UCL	19940
95% Percentile Bootstrap UCL	20869
95% BCA Bootstrap UCL	21036
95% Chebyshev(Mean, Sd) UCL	28260
97.5% Chebyshev(Mean, Sd) UCL	33351
99% Chebyshev(Mean, Sd) UCL	43351

Data appear Normal (0.05)
May want to try Normal UCLs

Lead

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	5.34
Maximum	14.5

Mean	9.587
Median	9.2
SD	3.603
Variance	12.98
Coefficient of Variation	0.376
Skewness	0.161
Mean of log data	2.194
SD of log data	0.393

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**11.82**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	11.63
95% Modified-t UCL	11.83
Non-Parametric UCLs	
95% CLT UCL	11.56
95% Jackknife UCL	11.82
95% Standard Bootstrap UCL	11.44
95% Bootstrap-t UCL	11.9
95% Hall's Bootstrap UCL	11.24
95% Percentile Bootstrap UCL	11.42
95% BCA Bootstrap UCL	11.65
95% Chebyshev(Mean, Sd) UCL	14.82
97.5% Chebyshev(Mean, Sd) UCL	17.09
99% Chebyshev(Mean, Sd) UCL	21.54

Data appear Normal (0.05)
May want to try Normal UCLs

Lithium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	7.29
Maximum	44.6
Mean	21.4
Median	17.1
SD	14.41
Variance	207.6
Coefficient of Variation	0.673
Skewness	0.724
Mean of log data	2.852
SD of log data	0.697

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**30.33**

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	30.54
95% Modified-t UCL	30.52

Non-Parametric UCLs	
95% CLT UCL	29.3
95% Jackknife UCL	30.33
95% Standard Bootstrap UCL	28.78
95% Bootstrap-t UCL	33.66
95% Hall's Bootstrap UCL	30.44
95% Percentile Bootstrap UCL	29
95% BCA Bootstrap UCL	29.67
95% Chebyshev(Mean, Sd) UCL	42.33
97.5% Chebyshev(Mean, Sd) UCL	51.39
99% Chebyshev(Mean, Sd) UCL	69.18

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	212
Maximum	442
Mean	330.7
Median	321
SD	88.99
Variance	7920
Coefficient of Variation	0.269
Skewness	-0.147
Mean of log data	5.767
SD of log data	0.284

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**385.8**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	377.9
95% Modified-t UCL	385.6

Non-Parametric UCLs	
95% CLT UCL	379.5
95% Jackknife UCL	385.8
95% Standard Bootstrap UCL	376.3
95% Bootstrap-t UCL	385.8
95% Hall's Bootstrap UCL	371.9
95% Percentile Bootstrap UCL	376.9
95% BCA Bootstrap UCL	373.4
95% Chebyshev(Mean, Sd) UCL	460
97.5% Chebyshev(Mean, Sd) UCL	515.9
99% Chebyshev(Mean, Sd) UCL	625.8

Data appear Normal (0.05)
May want to try Normal UCLs

Mercury

Number of Valid Observations	9
Number of Distinct Observations	8
Minimum	0.0065
Maximum	0.05
Mean	0.0176
Median	0.016
SD	0.0132
Variance	1.75E-04
Coefficient of Variation	0.753
Skewness	2.163
Mean of log data	-4.227
SD of log data	0.613

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	0.0258
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.0282
95% Modified-t UCL	0.0263
Non-Parametric UCLs	
95% CLT UCL	0.0248
95% Jackknife UCL	0.0258
95% Standard Bootstrap UCL	0.0247
95% Bootstrap-t UCL	0.0349
95% Hall's Bootstrap UCL	0.0567
95% Percentile Bootstrap UCL	0.025
95% BCA Bootstrap UCL	0.0277
95% Chebyshev(Mean, Sd) UCL	**0.0368**
97.5% Chebyshev(Mean, Sd) UCL	0.0452
99% Chebyshev(Mean, Sd) UCL	0.0615

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Molybdenum

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	0.16
Maximum	0.35
Mean	0.241
Median	0.24
SD	0.0675
Variance	0.00456
Coefficient of Variation	0.28
Skewness	0.35
Mean of log data	-1.458
SD of log data	0.282

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**0.283**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.281
95% Modified-t UCL	0.283
Non-Parametric UCLs	
95% CLT UCL	0.278
95% Jackknife UCL	0.283
95% Standard Bootstrap UCL	0.277
95% Bootstrap-t UCL	0.287
95% Hall's Bootstrap UCL	0.276
95% Percentile Bootstrap UCL	0.276
95% BCA Bootstrap UCL	0.276
95% Chebyshev(Mean, Sd) UCL	0.339
97.5% Chebyshev(Mean, Sd) UCL	0.382
99% Chebyshev(Mean, Sd) UCL	0.465

Data appear Normal (0.05)
May want to try Normal UCLs

Nickel

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	6.31
Maximum	27.3
Mean	14.91
Median	13
SD	8.111
Variance	65.79
Coefficient of Variation	0.544
Skewness	0.452
Mean of log data	2.562
SD of log data	0.571

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**19.94**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	19.79
95% Modified-t UCL	20.01
Non-Parametric UCLs	
95% CLT UCL	19.36
95% Jackknife UCL	19.94
95% Standard Bootstrap UCL	19.13
95% Bootstrap-t UCL	20.56
95% Hall's Bootstrap UCL	19.13
95% Percentile Bootstrap UCL	19.09
95% BCA Bootstrap UCL	19.63

95% Chebyshev(Mean, Sd) UCL	26.7
97.5% Chebyshev(Mean, Sd) UCL	31.8
99% Chebyshev(Mean, Sd) UCL	41.81

Data appear Normal (0.05)
May want to try Normal UCLs

Strontium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	34.8
Maximum	87.4
Mean	59.17
Median	59.3
SD	22.06
Variance	486.7
Coefficient of Variation	0.373
Skewness	0.141
Mean of log data	4.015
SD of log data	0.388

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**72.84**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	71.63
95% Modified-t UCL	72.9
Non-Parametric UCLs	
95% CLT UCL	71.26
95% Jackknife UCL	72.84
95% Standard Bootstrap UCL	70.42
95% Bootstrap-t UCL	73.24
95% Hall's Bootstrap UCL	68.5
95% Percentile Bootstrap UCL	70.59
95% BCA Bootstrap UCL	70.8
95% Chebyshev(Mean, Sd) UCL	91.22
97.5% Chebyshev(Mean, Sd) UCL	105.1
99% Chebyshev(Mean, Sd) UCL	132.3

Data appear Normal (0.05)
May want to try Normal UCLs

Titanium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	21.1
Maximum	54.5
Mean	31.79
Median	28.6
SD	10.49
Variance	110

Coefficient of Variation	0.33
Skewness	1.471
Mean of log data	3.417
SD of log data	0.297

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**38.29**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	39.37
95% Modified-t UCL	38.58
Non-Parametric UCLs	
95% CLT UCL	37.54
95% Jackknife UCL	38.29
95% Standard Bootstrap UCL	37.28
95% Bootstrap-t UCL	44.61
95% Hall's Bootstrap UCL	71.75
95% Percentile Bootstrap UCL	37.58
95% BCA Bootstrap UCL	39.1
95% Chebyshev(Mean, Sd) UCL	47.03
97.5% Chebyshev(Mean, Sd) UCL	53.62
99% Chebyshev(Mean, Sd) UCL	66.58

Data appear Normal (0.05)
May want to try Normal UCLs

Trichloroethene

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.0159
Maximum Detected	0.0159
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.000286
Maximum Non-detect	0.00276

Data set has all detected values equal to = 0.0159, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0159

**** Instead of UCL, EPC is selected to be median = <0.000647**
[per recommendation in ProUCL User Guide]

Vanadium

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	10.2
Maximum	34.2
Mean	20.21
Median	19.1

SD	9.135
Variance	83.45
Coefficient of Variation	0.452
Skewness	0.468
Mean of log data	2.913
SD of log data	0.461

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**25.87**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	25.73
95% Modified-t UCL	25.95
Non-Parametric UCLs	
95% CLT UCL	25.22
95% Jackknife UCL	25.87
95% Standard Bootstrap UCL	24.81
95% Bootstrap-t UCL	26.97
95% Hall's Bootstrap UCL	25.22
95% Percentile Bootstrap UCL	24.93
95% BCA Bootstrap UCL	25
95% Chebyshev(Mean, Sd) UCL	33.48
97.5% Chebyshev(Mean, Sd) UCL	39.23
99% Chebyshev(Mean, Sd) UCL	50.51

Data appear Normal (0.05)
May want to try Normal UCLs

Xylene (total)

Total Number of Data	9
Number of Non-Detect Data	8
Number of Detected Data	**1**
Minimum Detected	0.00335
Maximum Detected	0.00335
Percent Non-Detects	**88.89%**
Minimum Non-detect	0.000925
Maximum Non-detect	0.00891

Data set has all detected values equal to = 0.00335, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00335

**** Instead of UCL, EPC is selected to be median = <0.00209**
[per recommendation in ProUCL User Guide]

Zinc

Number of Valid Observations	9
Number of Distinct Observations	9
Minimum	19.3
Maximum	54.1

Mean	36.04
Median	34.1
SD	13.68
Variance	187
Coefficient of Variation	0.379
Skewness	0.0735
Mean of log data	3.515
SD of log data	0.404

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**44.52**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	43.66
95% Modified-t UCL	44.54
Non-Parametric UCLs	
95% CLT UCL	43.54
95% Jackknife UCL	44.52
95% Standard Bootstrap UCL	43.06
95% Bootstrap-t UCL	44.65
95% Hall's Bootstrap UCL	42.22
95% Percentile Bootstrap UCL	43.54
95% BCA Bootstrap UCL	43.28
95% Chebyshev(Mean, Sd) UCL	55.91
97.5% Chebyshev(Mean, Sd) UCL	64.51
99% Chebyshev(Mean, Sd) UCL	81.4

Data appear Normal (0.05)
May want to try Normal UCLs

APPENDIX A-8

NORTH OF MARLIN SEDIMENT

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	C:\Users\Michael\ . . . . \Gulfco Superfund Site\revised HHRA\N Wetland-May09 data\Gulfco N Wetland-May09 data_ProUCL input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2-Dichloroethane

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00183
Maximum Detected	0.0024
Percent Non-Detects	**93.75%**
Minimum Non-detect	1.23E-04
Maximum Non-detect	0.00265
Mean of Detected Data	0.00218
Median of Detected Data	0.00232
Variance of Detected Data	9.52E-08
SD of Detected Data	3.09E-04
CV of Detected Data	0.141
Skewness of Detected Data	-1.602
Mean of Detected log data	-6.134
SD of Detected Log data	0.148

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.00185
SD	1.07E-04

Standard Error of Mean	1.92E-05
95% KM (t) UCL	0.00188
95% KM (z) UCL	0.00188
95% KM (BCA) UCL	0.0024
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00194
97.5% KM (Chebyshev) UCL	0.00197
99% KM (Chebyshev) UCL	0.00204

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.00015**
[per recommendation in ProUCL User Guide]

2-Methylnaphthalene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.0122
Maximum Detected	0.43
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00851
Maximum Non-detect	0.173
Mean of Detected Data	0.134
Median of Detected Data	0.0463
Variance of Detected Data	0.0393
SD of Detected Data	0.198
CV of Detected Data	1.483
Skewness of Detected Data	1.956
Mean of Detected log data	-2.854
SD of Detected Log data	1.483

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	1
Single DL Percent Detection	97.92%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0225
SD	0.0599
Standard Error of Mean	0.00999
95% KM (t) UCL	0.0393
95% KM (z) UCL	0.039
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0661
97.5% KM (Chebyshev) UCL	0.0849
99% KM (Chebyshev) UCL	0.122

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01200**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	56
Number of Non-Detect Data	40
Number of Detected Data	**16**
Minimum Detected	9.29E-04
Maximum Detected	0.00922
Percent Non-Detects	**71.43%**
Minimum Non-detect	1.54E-04
Maximum Non-detect	0.00498

Mean of Detected Data	0.00254
Median of Detected Data	0.00192
Variance of Detected Data	4.33E-06
SD of Detected Data	0.00208
CV of Detected Data	0.821
Skewness of Detected Data	2.555
Mean of Detected log data	-6.177
SD of Detected Log data	0.594

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	55
Number treated as Detected	1
Single DL Percent Detection	98.21%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00139
SD	0.0013
Standard Error of Mean	1.80E-04
95% KM (t) UCL	0.0017
95% KM (z) UCL	0.00169
95% KM (BCA) UCL	0.00198
95% KM (Percentile Bootstrap) UCL	0.00184
95% KM (Chebyshev) UCL	0.00218
97.5% KM (Chebyshev) UCL	**0.00252**
99% KM (Chebyshev) UCL	0.00319

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Acenaphthene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.016
Maximum Detected	0.133
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00851
Maximum Non-detect	0.173

Mean of Detected Data	0.0748
Median of Detected Data	0.075
Variance of Detected Data	0.00324
SD of Detected Data	0.057
CV of Detected Data	0.762
Skewness of Detected Data	-0.0107
Mean of Detected log data	-2.907
SD of Detected Log data	0.997

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0213
SD	0.0224
Standard Error of Mean	0.00387
95% KM (t) UCL	0.0278
95% KM (z) UCL	0.0277
95% KM (BCA) UCL	0.133
95% KM (Percentile Bootstrap) UCL	0.114
95% KM (Chebyshev) UCL	0.0382
97.5% KM (Chebyshev) UCL	0.0455
99% KM (Chebyshev) UCL	0.0598

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01105**
[per recommendation in ProUCL User Guide]

Acenaphthylene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.0291
Maximum Detected	0.545
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00746
Maximum Non-detect	0.174
Mean of Detected Data	0.265
Median of Detected Data	0.243
Variance of Detected Data	0.0522
SD of Detected Data	0.228
CV of Detected Data	0.863
Skewness of Detected Data	0.418
Mean of Detected log data	-1.795
SD of Detected Log data	1.293

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0488
SD	0.0866
Standard Error of Mean	0.0144
95% KM (t) UCL	0.073
95% KM (z) UCL	0.0726
95% KM (BCA) UCL	0.545
95% KM (Percentile Bootstrap) UCL	0.545
95% KM (Chebyshev) UCL	0.112
97.5% KM (Chebyshev) UCL	0.139
99% KM (Chebyshev) UCL	0.193

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01270**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	48
Number of Distinct Observations	38
Minimum	3400
Maximum	19200
Mean	13229
Median	13650
SD	3162
Variance	9999496
Coefficient of Variation	0.239
Skewness	-0.611
Mean of log data	9.454
SD of log data	0.296

95% Useful UCLs	
Student's-t UCL	**13995**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	13936

95% Modified-t UCL	13988
Non-Parametric UCLs	
95% CLT UCL	13980
95% Jackknife UCL	13995
95% Standard Bootstrap UCL	13984
95% Bootstrap-t UCL	13961
95% Hall's Bootstrap UCL	13944
95% Percentile Bootstrap UCL	13956
95% BCA Bootstrap UCL	13934
95% Chebyshev(Mean, Sd) UCL	15218
97.5% Chebyshev(Mean, Sd) UCL	16079
99% Chebyshev(Mean, Sd) UCL	17770

Data appear Normal (0.05)
May want to try Normal UCLs

Anthracene

Total Number of Data	48
Number of Non-Detect Data	40
Number of Detected Data	**8**
Minimum Detected	0.00838
Maximum Detected	0.334
Percent Non-Detects	**83.33%**
Minimum Non-detect	0.00593
Maximum Non-detect	0.12
Mean of Detected Data	0.137
Median of Detected Data	0.111
Variance of Detected Data	0.0176
SD of Detected Data	0.133
CV of Detected Data	0.972
Skewness of Detected Data	0.321
Mean of Detected log data	-2.761
SD of Detected Log data	1.525

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	44
Number treated as Detected	4
Single DL Percent Detection	91.67%

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0299
SD	0.0696
Standard Error of Mean	0.0107
95% KM (t) UCL	0.0479
95% KM (z) UCL	0.0476
95% KM (BCA) UCL	0.0746
95% KM (Percentile Bootstrap) UCL	0.0547
95% KM (Chebyshev) UCL	0.0767
97.5% KM (Chebyshev) UCL	**0.097**
99% KM (Chebyshev) UCL	0.137

Data appear Normal (0.05)
May want to try Normal UCLs

Antimony

Total Number of Data	47
Number of Non-Detect Data	8
Number of Detected Data	**39**
Minimum Detected	0.65
Maximum Detected	4.24
Percent Non-Detects	**17.02%**
Minimum Non-detect	0.24
Maximum Non-detect	0.26
Mean of Detected Data	1.365
Median of Detected Data	1.25
Variance of Detected Data	0.366
SD of Detected Data	0.605
CV of Detected Data	0.443
Skewness of Detected Data	3.054
Mean of Detected log data	0.245
SD of Detected Log data	0.347

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	0.347
Mean	1.124
SD	0.317

95% Winsor (t) UCL	1.203

Kaplan Meier (KM) Method	
Mean	1.243
SD	0.607
Standard Error of Mean	0.0897
95% KM (t) UCL	1.394
95% KM (z) UCL	1.391
95% KM (BCA) UCL	1.417
95% KM (Percentile Bootstrap) UCL	1.411
95% KM (Chebyshev) UCL	1.634
97.5% KM (Chebyshev) UCL	**1.803**
99% KM (Chebyshev) UCL	2.136

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Arsenic

Total Number of Data	48
Number of Non-Detect Data	15
Number of Detected Data	**33**
Minimum Detected	1
Maximum Detected	12.8
Percent Non-Detects	**31.25%**
Minimum Non-detect	0.12
Maximum Non-detect	1.55

Mean of Detected Data	3.58
Median of Detected Data	2.83
Variance of Detected Data	5.289
SD of Detected Data	2.3
CV of Detected Data	0.642
Skewness of Detected Data	2.191
Mean of Detected log data	1.114
SD of Detected Log data	0.569

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	19
Number treated as Detected	29
Single DL Percent Detection	39.58%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	39.58%
Mean	2.191
SD	0.434

95% Winsor (t) UCL	2.306

Kaplan Meier (KM) Method	
Mean	2.775
SD	2.226
Standard Error of Mean	0.326
95% KM (t) UCL	3.322
95% KM (z) UCL	3.312
95% KM (BCA) UCL	3.433
95% KM (Percentile Bootstrap) UCL	3.376
95% KM (Chebyshev) UCL	4.197
97.5% KM (Chebyshev) UCL	**4.812**
99% KM (Chebyshev) UCL	6.021

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Barium

Number of Valid Observations	48
Number of Distinct Observations	46
Minimum	36
Maximum	820
Mean	151.7
Median	102.5
SD	136.5
Variance	18624
Coefficient of Variation	0.899
Skewness	3.09
Mean of log data	4.792
SD of log data	0.623

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	184.8
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	193.5
95% Modified-t UCL	186.2
Non-Parametric UCLs	
95% CLT UCL	184.1
95% Jackknife UCL	184.8
95% Standard Bootstrap UCL	184.1
95% Bootstrap-t UCL	203.7
95% Hall's Bootstrap UCL	214.8
95% Percentile Bootstrap UCL	185.5
95% BCA Bootstrap UCL	197.5
95% Chebyshev(Mean, Sd) UCL	237.6

97.5% Chebyshev(Mean, Sd) UCL	274.7
99% Chebyshev(Mean, Sd) UCL	347.7

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **237.6**

Benzo(a)anthracene

Total Number of Data	48
Number of Non-Detect Data	43
Number of Detected Data	**5**
Minimum Detected	0.0546
Maximum Detected	0.993
Percent Non-Detects	**89.58%**
Minimum Non-detect	0.00506
Maximum Non-detect	0.142

Mean of Detected Data	0.413
Median of Detected Data	0.199
Variance of Detected Data	0.177
SD of Detected Data	0.421
CV of Detected Data	1.019
Skewness of Detected Data	0.765
Mean of Detected log data	-1.442
SD of Detected Log data	1.258

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.092
SD	0.164
Standard Error of Mean	0.0264
95% KM (t) UCL	0.136
95% KM (z) UCL	0.135

95% KM (BCA) UCL	0.724
95% KM (Percentile Bootstrap) UCL	0.254
95% KM (Chebyshev) UCL	0.207
97.5% KM (Chebyshev) UCL	0.257
99% KM (Chebyshev) UCL	0.355

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01135**
[per recommendation in ProUCL User Guide]

Benzo(a)pyrene

Total Number of Data	48
Number of Non-Detect Data	33
Number of Detected Data	**15**
Minimum Detected	0.0176
Maximum Detected	1.3
Percent Non-Detects	**68.75%**
Minimum Non-detect	0.00862
Maximum Non-detect	0.132

Mean of Detected Data	0.313
Median of Detected Data	0.133
Variance of Detected Data	0.157
SD of Detected Data	0.397
CV of Detected Data	1.269
Skewness of Detected Data	1.521
Mean of Detected log data	-2.11
SD of Detected Log data	1.557

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	39
Number treated as Detected	9
Single DL Percent Detection	81.25%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.11
SD	0.254
Standard Error of Mean	0.038
95% KM (t) UCL	0.173
95% KM (z) UCL	0.172

95% KM (BCA) UCL	0.178
95% KM (Percentile Bootstrap) UCL	0.178
95% KM (Chebyshev) UCL	0.275
97.5% KM (Chebyshev) UCL	**0.347**
99% KM (Chebyshev) UCL	0.487

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Benzo(b)fluoranthene

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.0162
Maximum Detected	1.36
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.00754
Maximum Non-detect	0.153

Mean of Detected Data	0.206
Median of Detected Data	0.0474
Variance of Detected Data	0.123
SD of Detected Data	0.35
CV of Detected Data	1.697
Skewness of Detected Data	2.497
Mean of Detected log data	-2.563
SD of Detected Log data	1.342

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	42
Number treated as Detected	6
Single DL Percent Detection	87.50%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.0923
SD	0.233
Standard Error of Mean	0.0346
95% KM (t) UCL	0.15
95% KM (z) UCL	0.149
95% KM (BCA) UCL	0.159
95% KM (Percentile Bootstrap) UCL	0.152
95% KM (Chebyshev) UCL	0.243

97.5% KM (Chebyshev) UCL	0.309
99% KM (Chebyshev) UCL	0.437

Potential UCL to Use

95% KM (BCA) UCL	**0.159**

Benzo(g,h,i)perylene

Total Number of Data	48
Number of Non-Detect Data	24
Number of Detected Data	**24**
Minimum Detected	0.044
Maximum Detected	1.94
Percent Non-Detects	**50.00%**
Minimum Non-detect	0.00863
Maximum Non-detect	0.644

Mean of Detected Data	0.365
Median of Detected Data	0.144
Variance of Detected Data	0.244
SD of Detected Data	0.494
CV of Detected Data	1.355
Skewness of Detected Data	2.159
Mean of Detected log data	-1.648
SD of Detected Log data	1.076

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest DL are treated as NDs

Number treated as Non-Detect	43
Number treated as Detected	5
Single DL Percent Detection	89.58%

Data Dsitribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.206
SD	0.377
Standard Error of Mean	0.0557
95% KM (t) UCL	0.3
95% KM (z) UCL	0.298
95% KM (BCA) UCL	0.331
95% KM (Percentile Bootstrap) UCL	0.302
95% KM (Chebyshev) UCL	0.449
97.5% KM (Chebyshev) UCL	0.554
99% KM (Chebyshev) UCL	0.76

Potential UCL to Use	
95% KM (Chebyshev) UCL	**0.449**

Benzo(k)fluoranthene

Total Number of Data	48
Number of Non-Detect Data	34
Number of Detected Data	**14**
Minimum Detected	0.0692
Maximum Detected	0.73
Percent Non-Detects	**70.83%**
Minimum Non-detect	0.01
Maximum Non-detect	0.216
Mean of Detected Data	0.174
Median of Detected Data	0.128
Variance of Detected Data	0.0312
SD of Detected Data	0.177
CV of Detected Data	1.013
Skewness of Detected Data	2.806
Mean of Detected log data	-2.016
SD of Detected Log data	0.67

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.101
SD	0.104
Standard Error of Mean	0.0156
95% KM (t) UCL	0.127
95% KM (z) UCL	0.127
95% KM (BCA) UCL	0.135
95% KM (Percentile Bootstrap) UCL	0.131
95% KM (Chebyshev) UCL	0.169
97.5% KM (Chebyshev) UCL	0.198
99% KM (Chebyshev) UCL	0.256
Potential UCL to Use	
95% KM (t) UCL	0.127
95% KM (% Bootstrap) UCL	**0.131**

Beryllium

Number of Valid Observations	48
Number of Distinct Observations	36
Minimum	0.28
Maximum	1.37
Mean	0.894
Median	0.93
SD	0.206
Variance	0.0424
Coefficient of Variation	0.23
Skewness	-0.364
Mean of log data	-0.144
SD of log data	0.269
95% Useful UCLs	
Student's-t UCL	**0.943**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.941
95% Modified-t UCL	0.943
Non-Parametric UCLs	
95% CLT UCL	0.942
95% Jackknife UCL	0.943
95% Standard Bootstrap UCL	0.942
95% Bootstrap-t UCL	0.944
95% Hall's Bootstrap UCL	0.942
95% Percentile Bootstrap UCL	0.941
95% BCA Bootstrap UCL	0.942
95% Chebyshev(Mean, Sd) UCL	1.023
97.5% Chebyshev(Mean, Sd) UCL	1.079
99% Chebyshev(Mean, Sd) UCL	1.189

Data appear Normal (0.05)
May want to try Normal UCLs

Boron

Total Number of Data	48
Number of Non-Detect Data	23
Number of Detected Data	**25**
Minimum Detected	5.17
Maximum Detected	46.2
Percent Non-Detects	**47.92%**
Minimum Non-detect	1.16
Maximum Non-detect	40.9

Mean of Detected Data	22.7
Median of Detected Data	20.4
Variance of Detected Data	118.8
SD of Detected Data	10.9
CV of Detected Data	0.48
Skewness of Detected Data	0.557
Mean of Detected log data	2.997
SD of Detected Log data	0.54

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	15.27
SD	11.35
Standard Error of Mean	1.729
95% KM (t) UCL	18.17
95% KM (z) UCL	18.12
95% KM (BCA) UCL	20.12
95% KM (Percentile Bootstrap) UCL	19.07
95% KM (Chebyshev) UCL	22.81
97.5% KM (Chebyshev) UCL	**26.07**
99% KM (Chebyshev) UCL	32.48

Data appear Normal (0.05)
May want to try Normal UCLs

Cadmium

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.033
Maximum Detected	0.48
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.0058
Maximum Non-detect	0.039

Mean of Detected Data	0.243
Median of Detected Data	0.23
Variance of Detected Data	0.0216

SD of Detected Data	0.147
CV of Detected Data	0.606
Skewness of Detected Data	0.272
Mean of Detected log data	-1.645
SD of Detected Log data	0.761

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	30
Number treated as Detected	18
Single DL Percent Detection	62.50%

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	0.116
SD	0.136
Standard Error of Mean	0.0202
95% KM (t) UCL	0.15
95% KM (z) UCL	0.149
95% KM (BCA) UCL	0.175
95% KM (Percentile Bootstrap) UCL	0.167
95% KM (Chebyshev) UCL	0.204
97.5% KM (Chebyshev) UCL	**0.242**
99% KM (Chebyshev) UCL	0.317

Data appear Normal (0.05)
May want to try Normal UCLs

Carbazole

Total Number of Data	48
Number of Non-Detect Data	43
Number of Detected Data	**5**
Minimum Detected	0.0158
Maximum Detected	0.141
Percent Non-Detects	**89.58%**
Minimum Non-detect	0.00812
Maximum Non-detect	0.165

Mean of Detected Data	0.0644
Median of Detected Data	0.0262
Variance of Detected Data	0.00376
SD of Detected Data	0.0613
CV of Detected Data	0.952
Skewness of Detected Data	0.651

Mean of Detected log data	-3.176
SD of Detected Log data	1.059

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0212
SD	0.0238
Standard Error of Mean	0.00397
95% KM (t) UCL	0.0279
95% KM (z) UCL	0.0278
95% KM (BCA) UCL	0.141
95% KM (Percentile Bootstrap) UCL	0.0362
95% KM (Chebyshev) UCL	0.0385
97.5% KM (Chebyshev) UCL	0.046
99% KM (Chebyshev) UCL	0.0607

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01100**
[per recommendation in ProUCL User Guide]

Carbon disulfide

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.00334
Maximum Detected	0.00699
Percent Non-Detects	**91.67%**
Minimum Non-detect	1.18E-04
Maximum Non-detect	0.00253

Mean of Detected Data	0.00507
Median of Detected Data	0.00497
Variance of Detected Data	2.23E-06
SD of Detected Data	0.00149
CV of Detected Data	0.295
Skewness of Detected Data	0.389
Mean of Detected log data	-5.318
SD of Detected Log data	0.302

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00348
SD	6.06E-04
Standard Error of Mean	1.01E-04
95% KM (t) UCL	0.00365
95% KM (z) UCL	0.00365
95% KM (BCA) UCL	0.00699
95% KM (Percentile Bootstrap) UCL	0.00513
95% KM (Chebyshev) UCL	0.00392
97.5% KM (Chebyshev) UCL	0.00411
99% KM (Chebyshev) UCL	0.00449

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.00014**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	48
Number of Distinct Observations	42
Minimum	8.96
Maximum	44.6
Mean	15.07
Median	14.1

SD	5.536
Variance	30.64
Coefficient of Variation	0.367
Skewness	3.399
Mean of log data	2.667
SD of log data	0.286

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	16.41
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.81
95% Modified-t UCL	16.48
Non-Parametric UCLs	
95% CLT UCL	16.39
95% Jackknife UCL	16.41
95% Standard Bootstrap UCL	16.38
95% Bootstrap-t UCL	17.12
95% Hall's Bootstrap UCL	22.5
95% Percentile Bootstrap UCL	16.55
95% BCA Bootstrap UCL	16.98
95% Chebyshev(Mean, Sd) UCL	18.56
97.5% Chebyshev(Mean, Sd) UCL	20.06
99% Chebyshev(Mean, Sd) UCL	23.02

Potential UCL to Use	
Use 95% Student's-t UCL	16.41
Or 95% Modified-t UCL	**16.48**

Chromium VI

Total Number of Data	25
Number of Non-Detect Data	19
Number of Detected Data	**6**
Minimum Detected	1.3
Maximum Detected	4.04
Percent Non-Detects	**76.00%**
Minimum Non-detect	0.361
Maximum Non-detect	2.98
Mean of Detected Data	2.667
Median of Detected Data	2.585
Variance of Detected Data	1.786
SD of Detected Data	1.337
CV of Detected Data	0.501
Skewness of Detected Data	0.0422
Mean of Detected log data	0.864

SD of Detected Log data	0.542

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	22
Number treated as Detected	3
Single DL Percent Detection	88.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	1.631
SD	0.835
Standard Error of Mean	0.183
95% KM (t) UCL	1.944
95% KM (z) UCL	1.932
95% KM (BCA) UCL	3.616
95% KM (Percentile Bootstrap) UCL	2.136
95% KM (Chebyshev) UCL	2.429
97.5% KM (Chebyshev) UCL	2.774
99% KM (Chebyshev) UCL	3.452

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

**** Instead of UCL, EPC is selected to be median** **<0.56700**
[per recommendation in ProUCL User Guide]

Chrysene

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.011
Maximum Detected	4.05
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.00755
Maximum Non-detect	0.253
Mean of Detected Data	0.525

Median of Detected Data	0.0813
Variance of Detected Data	1.167
SD of Detected Data	1.08
CV of Detected Data	2.059
Skewness of Detected Data	2.633
Mean of Detected log data	-2.274
SD of Detected Log data	1.773

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	43
Number treated as Detected	5
Single DL Percent Detection	89.58%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.215
SD	0.708
Standard Error of Mean	0.105
95% KM (t) UCL	0.391
95% KM (z) UCL	0.388
95% KM (BCA) UCL	0.421
95% KM (Percentile Bootstrap) UCL	0.405
95% KM (Chebyshev) UCL	0.673
97.5% KM (Chebyshev) UCL	**0.871**
99% KM (Chebyshev) UCL	1.259

Potential UCL to Use ______

Cobalt

Number of Valid Observations	48
Number of Distinct Observations	46
Minimum	3
Maximum	9.89
Mean	6.977
Median	7.29
SD	1.408
Variance	1.983
Coefficient of Variation	0.202
Skewness	-0.339
Mean of log data	1.92
SD of log data	0.223

95% Useful UCLs

Student's-t UCL	**7.318**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7.3
95% Modified-t UCL	7.316
Non-Parametric UCLs	
95% CLT UCL	7.311
95% Jackknife UCL	7.318
95% Standard Bootstrap UCL	7.311
95% Bootstrap-t UCL	7.306
95% Hall's Bootstrap UCL	7.325
95% Percentile Bootstrap UCL	7.313
95% BCA Bootstrap UCL	7.304
95% Chebyshev(Mean, Sd) UCL	7.863
97.5% Chebyshev(Mean, Sd) UCL	8.246
99% Chebyshev(Mean, Sd) UCL	8.999

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	48
Number of Distinct Observations	44
Minimum	5.44
Maximum	49
Mean	14.49
Median	13.15
SD	8.49
Variance	72.09
Coefficient of Variation	0.586
Skewness	2.371
Mean of log data	2.553
SD of log data	0.471
95% Useful UCLs	
Student's-t UCL	16.55
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	16.96
95% Modified-t UCL	16.62
Non-Parametric UCLs	
95% CLT UCL	16.51
95% Jackknife UCL	16.55
95% Standard Bootstrap UCL	16.52
95% Bootstrap-t UCL	17.22
95% Hall's Bootstrap UCL	17.57
95% Percentile Bootstrap UCL	16.61

95% BCA Bootstrap UCL	17.21
95% Chebyshev(Mean, Sd) UCL	19.83
97.5% Chebyshev(Mean, Sd) UCL	**22.14**
99% Chebyshev(Mean, Sd) UCL	26.68

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Dibenz(a,h)anthracene

Total Number of Data	48
Number of Non-Detect Data	42
Number of Detected Data	**6**
Minimum Detected	0.129
Maximum Detected	2.91
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00635
Maximum Non-detect	0.743
Mean of Detected Data	1.391
Median of Detected Data	1.084
Variance of Detected Data	1.688
SD of Detected Data	1.299
CV of Detected Data	0.934
Skewness of Detected Data	0.291
Mean of Detected log data	-0.265
SD of Detected Log data	1.334

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.287
SD	0.592
Standard Error of Mean	0.0936

95% KM (t) UCL	0.444
95% KM (z) UCL	0.441
95% KM (BCA) UCL	1.896
95% KM (Percentile Bootstrap) UCL	0.676
95% KM (Chebyshev) UCL	0.695
97.5% KM (Chebyshev) UCL	0.872
99% KM (Chebyshev) UCL	1.218

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.03750**
[per recommendation in ProUCL User Guide]

Dibenzofuran

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.01
Maximum Detected	0.08
Percent Non-Detects	**93.75%**
Minimum Non-detect	0.00506
Maximum Non-detect	0.103

Mean of Detected Data	0.0525
Median of Detected Data	0.0674
Variance of Detected Data	0.00139
SD of Detected Data	0.0373
CV of Detected Data	0.711
Skewness of Detected Data	-1.513
Mean of Detected log data	-3.276
SD of Detected Log data	1.154

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0129
SD	0.0133
Standard Error of Mean	0.00243
95% KM (t) UCL	0.0169
95% KM (z) UCL	0.0169
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.08
95% KM (Chebyshev) UCL	0.0235
97.5% KM (Chebyshev) UCL	0.028
99% KM (Chebyshev) UCL	0.0371

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.01555**
[per recommendation in ProUCL User Guide]

Endosulfan sulfate

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00731
Maximum Detected	0.06
Percent Non-Detects	**93.75%**
Minimum Non-detect	2.89E-04
Maximum Non-detect	0.00527

Mean of Detected Data	0.0257
Median of Detected Data	0.00989
Variance of Detected Data	8.82E-04
SD of Detected Data	0.0297
CV of Detected Data	1.154
Skewness of Detected Data	1.717
Mean of Detected log data	-4.116
SD of Detected Log data	1.138

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00846
SD	0.00753
Standard Error of Mean	0.00133
95% KM (t) UCL	0.0107
95% KM (z) UCL	0.0107
95% KM (BCA) UCL	0.06
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.0143
97.5% KM (Chebyshev) UCL	0.0168
99% KM (Chebyshev) UCL	0.0217

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.00044**
[per recommendation in ProUCL User Guide]

Endrin aldehyde

Total Number of Data	48
Number of Non-Detect Data	39
Number of Detected Data	**9**
Minimum Detected	5.66E-04
Maximum Detected	0.01
Percent Non-Detects	**81.25%**
Minimum Non-detect	3.94E-04
Maximum Non-detect	0.00579
Mean of Detected Data	0.00434
Median of Detected Data	0.00431
Variance of Detected Data	1.42E-05
SD of Detected Data	0.00377
CV of Detected Data	0.869
Skewness of Detected Data	0.564
Mean of Detected log data	-5.917
SD of Detected Log data	1.135

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.00128
SD	0.00213
Standard Error of Mean	3.27E-04
95% KM (t) UCL	0.00183
95% KM (z) UCL	0.00182
95% KM (BCA) UCL	0.00233
95% KM (Percentile Bootstrap) UCL	0.00214
95% KM (Chebyshev) UCL	0.0027
97.5% KM (Chebyshev) UCL	**0.00332**
99% KM (Chebyshev) UCL	0.00453

Data appear Normal (0.05)
May want to try Normal UCLs

Endrin ketone

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00329
Maximum Detected	0.013
Percent Non-Detects	**93.75%**
Minimum Non-detect	3.79E-04
Maximum Non-detect	0.00527

Mean of Detected Data	0.00749
Median of Detected Data	0.00619
Variance of Detected Data	2.48E-05
SD of Detected Data	0.00498
CV of Detected Data	0.665
Skewness of Detected Data	1.096
Mean of Detected log data	-5.048
SD of Detected Log data	0.688

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	46
Number treated as Detected	2
Single DL Percent Detection	95.83%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00355
SD	0.00144
Standard Error of Mean	2.54E-04
95% KM (t) UCL	0.00398
95% KM (z) UCL	0.00397
95% KM (BCA) UCL	0.013
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.00466
97.5% KM (Chebyshev) UCL	0.00514
99% KM (Chebyshev) UCL	0.00608

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.00055**
[per recommendation in ProUCL User Guide]

Fluoranthene

Total Number of Data	48
Number of Non-Detect Data	35
Number of Detected Data	**13**
Minimum Detected	0.012
Maximum Detected	2.17
Percent Non-Detects	**72.92%**
Minimum Non-detect	0.00647
Maximum Non-detect	0.213
Mean of Detected Data	0.346

Median of Detected Data	0.0548
Variance of Detected Data	0.444
SD of Detected Data	0.667
CV of Detected Data	1.925
Skewness of Detected Data	2.359
Mean of Detected log data	-2.413
SD of Detected Log data	1.622

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	45
Number treated as Detected	3
Single DL Percent Detection	93.75%

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.104
SD	0.365
Standard Error of Mean	0.0548
95% KM (t) UCL	0.196
95% KM (z) UCL	0.194
95% KM (BCA) UCL	0.213
95% KM (Percentile Bootstrap) UCL	0.206
95% KM (Chebyshev) UCL	0.343
97.5% KM (Chebyshev) UCL	**0.446**
99% KM (Chebyshev) UCL	0.649

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Fluorene

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	0.015
Maximum Detected	0.139
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.00659
Maximum Non-detect	0.135
Mean of Detected Data	0.0923
Median of Detected Data	0.108
Variance of Detected Data	0.00313
SD of Detected Data	0.0559

CV of Detected Data	0.606
Skewness of Detected Data	-1.209
Mean of Detected log data	-2.667
SD of Detected Log data	1.041

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	47
Number treated as Detected	1
Single DL Percent Detection	97.92%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0217
SD	0.0259
Standard Error of Mean	0.00439
95% KM (t) UCL	0.029
95% KM (z) UCL	0.0289
95% KM (BCA) UCL	0.139
95% KM (Percentile Bootstrap) UCL	0.128
95% KM (Chebyshev) UCL	0.0408
97.5% KM (Chebyshev) UCL	0.0491
99% KM (Chebyshev) UCL	0.0653

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median <0.01100**
[per recommendation in ProUCL User Guide]

gamma-Chlordane

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	7.69E-04
Maximum Detected	0.0036
Percent Non-Detects	**91.67%**
Minimum Non-detect	2.40E-04

Maximum Non-detect	0.00423
Mean of Detected Data	0.00203
Median of Detected Data	0.00188
Variance of Detected Data	1.91E-06
SD of Detected Data	0.00138
CV of Detected Data	0.68
Skewness of Detected Data	0.276
Mean of Detected log data	-6.403
SD of Detected Log data	0.761

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	8.77E-04
SD	4.96E-04
Standard Error of Mean	8.35E-05
95% KM (t) UCL	0.00102
95% KM (z) UCL	0.00101
95% KM (BCA) UCL	0.0036
95% KM (Percentile Bootstrap) UCL	0.00283
95% KM (Chebyshev) UCL	0.00124
97.5% KM (Chebyshev) UCL	0.0014
99% KM (Chebyshev) UCL	0.00171

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.00044**
[per recommendation in ProUCL User Guide]

Indeno(1,2,3-cd)pyrene

Total Number of Data 48

Number of Non-Detect Data	25
Number of Detected Data	**23**
Minimum Detected	0.0628
Maximum Detected	1.94
Percent Non-Detects	**52.08%**
Minimum Non-detect	0.013
Maximum Non-detect	0.55
Mean of Detected Data	0.388
Median of Detected Data	0.118
Variance of Detected Data	0.279
SD of Detected Data	0.528
CV of Detected Data	1.361
Skewness of Detected Data	1.896
Mean of Detected log data	-1.668
SD of Detected Log data	1.156

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	42
Number treated as Detected	6
Single DL Percent Detection	87.50%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.22
SD	0.393
Standard Error of Mean	0.0579
95% KM (t) UCL	0.317
95% KM (z) UCL	0.315
95% KM (BCA) UCL	0.317
95% KM (Percentile Bootstrap) UCL	0.321
95% KM (Chebyshev) UCL	0.472
97.5% KM (Chebyshev) UCL	0.581
99% KM (Chebyshev) UCL	0.796

Potential UCL to Use

95% KM (BCA) UCL	**0.317**

Iron

Number of Valid Observations	48
Number of Distinct Observations	37
Minimum	11100
Maximum	60900

Mean	17152
Median	16650
SD	6903
Variance	47645953
Coefficient of Variation	0.402
Skewness	5.582
Mean of log data	9.71
SD of log data	0.25

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	18824
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	19649
95% Modified-t UCL	18958
Non-Parametric UCLs	
95% CLT UCL	18791
95% Jackknife UCL	18824
95% Standard Bootstrap UCL	18718
95% Bootstrap-t UCL	20832
95% Hall's Bootstrap UCL	25660
95% Percentile Bootstrap UCL	18863
95% BCA Bootstrap UCL	20117
95% Chebyshev(Mean, Sd) UCL	21495
97.5% Chebyshev(Mean, Sd) UCL	23374
99% Chebyshev(Mean, Sd) UCL	27065

Potential UCL to Use	
Use 95% Student's-t UCL	18824
Or 95% Modified-t UCL	**18958**

Lead

Number of Valid Observations	48
Number of Distinct Observations	45
Minimum	9.4
Maximum	237
Mean	25.36
Median	16.7
SD	34.13
Variance	1165
Coefficient of Variation	1.346
Skewness	5.449
Mean of log data	2.969
SD of log data	0.571

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	33.62
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	37.6
95% Modified-t UCL	34.27
Non-Parametric UCLs	
95% CLT UCL	33.46
95% Jackknife UCL	33.62
95% Standard Bootstrap UCL	33.12
95% Bootstrap-t UCL	48.81
95% Hall's Bootstrap UCL	62.56
95% Percentile Bootstrap UCL	34.42
95% BCA Bootstrap UCL	39.58
95% Chebyshev(Mean, Sd) UCL	46.83
97.5% Chebyshev(Mean, Sd) UCL	56.12
99% Chebyshev(Mean, Sd) UCL	74.38
Potential UCL to Use	
Use 95% Chebyshev (Mean, Sd) UCL	**46.83**

Lithium

Number of Valid Observations	48
Number of Distinct Observations	43
Minimum	5.43
Maximum	27.6
Mean	18.65
Median	18.75
SD	3.754
Variance	14.09
Coefficient of Variation	0.201
Skewness	-0.745
Mean of log data	2.9
SD of log data	0.25
95% Useful UCLs	
Student's-t UCL	**19.56**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	19.48
95% Modified-t UCL	19.55
Non-Parametric UCLs	
95% CLT UCL	19.55
95% Jackknife UCL	19.56
95% Standard Bootstrap UCL	19.57
95% Bootstrap-t UCL	19.51

95% Hall's Bootstrap UCL	19.54
95% Percentile Bootstrap UCL	19.56
95% BCA Bootstrap UCL	19.43
95% Chebyshev(Mean, Sd) UCL	21.02
97.5% Chebyshev(Mean, Sd) UCL	22.04
99% Chebyshev(Mean, Sd) UCL	24.05

Data appear Normal (0.05)
May want to try Normal UCLs

Manganese

Number of Valid Observations	48
Number of Distinct Observations	48
Minimum	87.6
Maximum	1010
Mean	331.8
Median	275
SD	205.9
Variance	42405
Coefficient of Variation	0.621
Skewness	1.558
Mean of log data	5.638
SD of log data	0.583
95% Useful UCLs	
Student's-t UCL	381.7
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	387.8
95% Modified-t UCL	382.8
Non-Parametric UCLs	
95% CLT UCL	380.7
95% Jackknife UCL	381.7
95% Standard Bootstrap UCL	380.9
95% Bootstrap-t UCL	388.6
95% Hall's Bootstrap UCL	389.8
95% Percentile Bootstrap UCL	381.8
95% BCA Bootstrap UCL	387.6
95% Chebyshev(Mean, Sd) UCL	461.3
97.5% Chebyshev(Mean, Sd) UCL	**517.4**
99% Chebyshev(Mean, Sd) UCL	627.5

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Mercury

Total Number of Data	48
Number of Non-Detect Data	21
Number of Detected Data	**27**
Minimum Detected	0.0061
Maximum Detected	0.081
Percent Non-Detects	**43.75%**
Minimum Non-detect	0.0025
Maximum Non-detect	0.038
Mean of Detected Data	0.0294
Median of Detected Data	0.024
Variance of Detected Data	4.64E-04
SD of Detected Data	0.0215
CV of Detected Data	0.733
Skewness of Detected Data	1.056
Mean of Detected log data	-3.791
SD of Detected Log data	0.758

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	40
Number treated as Detected	8
Single DL Percent Detection	83.33%

Data Dsitribution Test with Detected Values Only
Data appear Gamma Distributed at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method

Mean	0.0204
SD	0.019
Standard Error of Mean	0.00282
95% KM (t) UCL	0.0251
95% KM (z) UCL	0.025
95% KM (BCA) UCL	0.0256
95% KM (Percentile Bootstrap) UCL	0.0251
95% KM (Chebyshev) UCL	0.0327
97.5% KM (Chebyshev) UCL	**0.038**
99% KM (Chebyshev) UCL	0.0485

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Molybdenum

Total Number of Data	48
Number of Non-Detect Data	10
Number of Detected Data	38

Minimum Detected	0.13
Maximum Detected	3.24
Percent Non-Detects	20.83%
Minimum Non-detect	0.074
Maximum Non-detect	0.084
Mean of Detected Data	0.723
Median of Detected Data	0.445
Variance of Detected Data	0.482
SD of Detected Data	0.694
CV of Detected Data	0.961
Skewness of Detected Data	2.229
Mean of Detected log data	-0.636
SD of Detected Log data	0.754

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Data Dsitribution Test with Detected Values Only
Data appear Lognormal at 5% Significance Level

Winsorization Method	0.754
Mean	0.413
SD	0.229
95% Winsor (t) UCL	0.47
Kaplan Meier (KM) Method	
Mean	0.599
SD	0.655
Standard Error of Mean	0.0959
95% KM (t) UCL	0.76
95% KM (z) UCL	0.757
95% KM (BCA) UCL	0.775
95% KM (Percentile Bootstrap) UCL	0.769
95% KM (Chebyshev) UCL	1.017
97.5% KM (Chebyshev) UCL	**1.198**
99% KM (Chebyshev) UCL	1.553

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Nickel

Number of Valid Observations	50
Number of Distinct Observations	43
Minimum	10.9
Maximum	27.7
Mean	17.29
Median	17.3

SD	3.391
Variance	11.5
Coefficient of Variation	0.196
Skewness	0.421
Mean of log data	2.831
SD of log data	0.197

95% Useful UCLs

Student's-t UCL	**18.09**

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	18.11
95% Modified-t UCL	18.09

Non-Parametric UCLs

95% CLT UCL	18.07
95% Jackknife UCL	18.09
95% Standard Bootstrap UCL	18.08
95% Bootstrap-t UCL	18.1
95% Hall's Bootstrap UCL	18.14
95% Percentile Bootstrap UCL	18.04
95% BCA Bootstrap UCL	18.12
95% Chebyshev(Mean, Sd) UCL	19.38
97.5% Chebyshev(Mean, Sd) UCL	20.28
99% Chebyshev(Mean, Sd) UCL	22.06

Data appear Normal (0.05)
May want to try Normal UCLs

Phenanthrene

Total Number of Data	48
Number of Non-Detect Data	36
Number of Detected Data	**12**
Minimum Detected	0.023
Maximum Detected	1.3
Percent Non-Detects	**75.00%**
Minimum Non-detect	0.00616
Maximum Non-detect	0.125

Mean of Detected Data	0.268
Median of Detected Data	0.0938
Variance of Detected Data	0.209
SD of Detected Data	0.457
CV of Detected Data	1.707
Skewness of Detected Data	2.03
Mean of Detected log data	-2.324
SD of Detected Log data	1.352

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	44
Number treated as Detected	4
Single DL Percent Detection	91.67%

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.0846
SD	0.243
Standard Error of Mean	0.0366
95% KM (t) UCL	0.146
95% KM (z) UCL	0.145
95% KM (BCA) UCL	0.156
95% KM (Percentile Bootstrap) UCL	0.149
95% KM (Chebyshev) UCL	0.244
97.5% KM (Chebyshev) UCL	0.313
99% KM (Chebyshev) UCL	0.449

Potential UCL to Use	
95% KM (BCA) UCL	**0.156**

Pyrene

Total Number of Data	48
Number of Non-Detect Data	29
Number of Detected Data	**19**
Minimum Detected	0.0159
Maximum Detected	1.64
Percent Non-Detects	**60.42%**
Minimum Non-detect	0.00816
Maximum Non-detect	0.371

Mean of Detected Data	0.355
Median of Detected Data	0.109
Variance of Detected Data	0.255
SD of Detected Data	0.505
CV of Detected Data	1.42
Skewness of Detected Data	1.636
Mean of Detected log data	-2.033
SD of Detected Log data	1.485

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),	
Observations < Largest DL are treated as NDs	
Number treated as Non-Detect	43

Number treated as Detected	5
Single DL Percent Detection	89.58%

Data Dsitribution Test with Detected Values Only
Data Follow Appr. Gamma Distribution at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.152
SD	0.351
Standard Error of Mean	0.052
95% KM (t) UCL	0.239
95% KM (z) UCL	0.237
95% KM (BCA) UCL	0.254
95% KM (Percentile Bootstrap) UCL	0.245
95% KM (Chebyshev) UCL	0.379
97.5% KM (Chebyshev) UCL	**0.477**
99% KM (Chebyshev) UCL	0.669

Data follow Appr. Gamma Distribution (0.05)
May want to try Gamma UCLs

Strontium

Number of Valid Observations	48
Number of Distinct Observations	47
Minimum	18.8
Maximum	330
Mean	67
Median	54
SD	52.81
Variance	2789
Coefficient of Variation	0.788
Skewness	3.229
Mean of log data	4.025
SD of log data	0.557

95% Useful UCLs	
Student's-t UCL	79.79
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	83.33
95% Modified-t UCL	80.38
Non-Parametric UCLs	
95% CLT UCL	79.53
95% Jackknife UCL	79.79
95% Standard Bootstrap UCL	79.32
95% Bootstrap-t UCL	88.66

95% Hall's Bootstrap UCL	98.83
95% Percentile Bootstrap UCL	81.07
95% BCA Bootstrap UCL	85.31
95% Chebyshev(Mean, Sd) UCL	100.2
97.5% Chebyshev(Mean, Sd) UCL	**114.6**
99% Chebyshev(Mean, Sd) UCL	142.8

Data appear Lognormal (0.05)
May want to try Lognormal UCLs

Tin

Total Number of Data	48
Number of Non-Detect Data	44
Number of Detected Data	**4**
Minimum Detected	3.45
Maximum Detected	4.61
Percent Non-Detects	**91.67%**
Minimum Non-detect	0.4
Maximum Non-detect	1.29

Mean of Detected Data	3.845
Median of Detected Data	3.66
Variance of Detected Data	0.27
SD of Detected Data	0.52
CV of Detected Data	0.135
Skewness of Detected Data	1.771
Mean of Detected log data	1.34
SD of Detected Log data	0.128

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method

Mean	3.483
SD	0.17
Standard Error of Mean	0.0283
95% KM (t) UCL	3.53

95% KM (z) UCL	3.529
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	3.738
95% KM (Chebyshev) UCL	3.606
97.5% KM (Chebyshev) UCL	3.66
99% KM (Chebyshev) UCL	3.764

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median** **<0.60000**
[per recommendation in ProUCL User Guide]

Titanium

Number of Valid Observations	48
Number of Distinct Observations	44
Minimum	8.15
Maximum	68.7
Mean	29.14
Median	28
SD	13.88
Variance	192.7
Coefficient of Variation	0.476
Skewness	1.065
Mean of log data	3.267
SD of log data	0.465
95% Useful UCLs	
Student's-t UCL	32.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	32.77
95% Modified-t UCL	32.55
Non-Parametric UCLs	
95% CLT UCL	32.44
95% Jackknife UCL	32.5
95% Standard Bootstrap UCL	32.44
95% Bootstrap-t UCL	32.97
95% Hall's Bootstrap UCL	32.68
95% Percentile Bootstrap UCL	32.57
95% BCA Bootstrap UCL	32.71
95% Chebyshev(Mean, Sd) UCL	37.87
97.5% Chebyshev(Mean, Sd) UCL	**41.65**
99% Chebyshev(Mean, Sd) UCL	49.08

Data appear Gamma Distributed (0.05)
May want to try Gamma UCLs

Toluene

Total Number of Data	48
Number of Non-Detect Data	45
Number of Detected Data	**3**
Minimum Detected	0.00157
Maximum Detected	0.00214
Percent Non-Detects	**93.75%**
Minimum Non-detect	5.94E-04
Maximum Non-detect	0.0128

Mean of Detected Data	0.00178
Median of Detected Data	0.00162
Variance of Detected Data	9.96E-08
SD of Detected Data	3.16E-04
CV of Detected Data	0.178
Skewness of Detected Data	1.683
Mean of Detected log data	-6.343
SD of Detected Log data	0.17

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	48
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method N/A

Kaplan Meier (KM) Method	
Mean	0.00158
SD	8.33E-05
Standard Error of Mean	1.50E-05
95% KM (t) UCL	0.00161
95% KM (z) UCL	0.00161
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.00214
95% KM (Chebyshev) UCL	0.00165
97.5% KM (Chebyshev) UCL	0.00168

99% KM (Chebyshev) UCL	0.00173

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median [per recommendation in ProUCL User Guide]**	**<0.00073**

Vanadium

Number of Valid Observations	48
Number of Distinct Observations	39
Minimum	9.02
Maximum	32
Mean	21.65
Median	21.75
SD	4.554
Variance	20.74
Coefficient of Variation	0.21
Skewness	-0.279
Mean of log data	3.05
SD of log data	0.233
95% Useful UCLs	
Student's-t UCL	**22.75**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	22.7
95% Modified-t UCL	22.74
Non-Parametric UCLs	
95% CLT UCL	22.73
95% Jackknife UCL	22.75
95% Standard Bootstrap UCL	22.72
95% Bootstrap-t UCL	22.75
95% Hall's Bootstrap UCL	22.77
95% Percentile Bootstrap UCL	22.7
95% BCA Bootstrap UCL	22.67
95% Chebyshev(Mean, Sd) UCL	24.51
97.5% Chebyshev(Mean, Sd) UCL	25.75
99% Chebyshev(Mean, Sd) UCL	28.19

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	53
Number of Distinct Observations	53

Minimum	31.5
Maximum	903
Mean	139.1
Median	84.3
SD	160.9
Variance	25899
Coefficient of Variation	1.157
Skewness	2.989
Mean of log data	4.558
SD of log data	0.795

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	176.1
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	185.2
95% Modified-t UCL	177.6
Non-Parametric UCLs	
95% CLT UCL	175.5
95% Jackknife UCL	176.1
95% Standard Bootstrap UCL	176.1
95% Bootstrap-t UCL	198.2
95% Hall's Bootstrap UCL	196.5
95% Percentile Bootstrap UCL	179.1
95% BCA Bootstrap UCL	183.4
95% Chebyshev(Mean, Sd) UCL	235.5
97.5% Chebyshev(Mean, Sd) UCL	277.1
99% Chebyshev(Mean, Sd) UCL	359

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **235.5**

APPENDIX A-9

POND SEDIMENT

Nonparametric UCL Statistics for Data Sets with Non-Detects

User Selected Options		
From File	C:\Users\Michael\ . . . . \ProUCL data analysis\Pond Sediment\Pond sediment data_ProUCL input.wst	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

2,4,6-Trichlorophenol

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0429
Maximum Detected	0.0429
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.025
Maximum Non-detect	0.033

Data set has all detected values equal to = 0.0429, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0429

**** Instead of UCL, EPC is selected to be median = <0.0269**
[per recommendation in ProUCL User Guide]

4,4'-DDD

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.00068
Maximum Detected	0.00068
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00046
Maximum Non-detect	0.026

Data set has all detected values equal to = 6.7600E-4, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 6.7600E-4

**** Instead of UCL, EPC is selected to be median = <0.020**
[per recommendation in ProUCL User Guide]

4,4'-DDT

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	0.00111
Maximum Detected	0.00157
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.011
Maximum Non-detect	0.014
Mean of Detected Data	0.00127
Median of Detected Data	0.00113
Variance of Detected Data	6.76E-08
SD of Detected Data	2.60E-04
CV of Detected Data	0.205
Skewness of Detected Data	1.721

Mean of Detected log data	-6.682
SD of Detected Log data	0.195

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	8
Number treated as Detected	0
Single DL Percent Detection	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.00127
SD	2.12E-04
Standard Error of Mean	1.50E-04
95% KM (t) UCL	0.00155
95% KM (z) UCL	0.00152
95% KM (BCA) UCL	0.00148
95% KM (Percentile Bootstrap) UCL	0.00157
95% KM (Chebyshev) UCL	0.00192
97.5% KM (Chebyshev) UCL	0.00221
99% KM (Chebyshev) UCL	0.00276

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0110**
[per recommendation in ProUCL User Guide]

Acetone

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0798
Maximum Detected	0.0798
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00066
Maximum Non-detect	0.073

Data set has all detected values equal to = 0.0798, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0798

**** Instead of UCL, EPC is selected to be median = <0.0425**
[per recommendation in ProUCL User Guide]

Aluminum

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	7990
Maximum	16300
Mean	11748
Median	11550
SD	3382
Variance	11436193
Coefficient of Variation	0.288
Skewness	0.211
Mean of log data	9.334
SD of log data	0.293

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**14013**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	13810
95% Modified-t UCL	14028
Non-Parametric UCLs	
95% CLT UCL	13714
95% Jackknife UCL	14013
95% Standard Bootstrap UCL	13591
95% Bootstrap-t UCL	14179
95% Hall's Bootstrap UCL	13371
95% Percentile Bootstrap UCL	13634
95% BCA Bootstrap UCL	13558
95% Chebyshev(Mean, Sd) UCL	16959
97.5% Chebyshev(Mean, Sd) UCL	19214
99% Chebyshev(Mean, Sd) UCL	23644

Data appear Normal (0.05)
May want to try Normal UCLs

Antimony

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	1.34
Maximum Detected	1.85
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.33
Maximum Non-detect	0.44
Mean of Detected Data	1.517
Median of Detected Data	1.36
Variance of Detected Data	0.0834
SD of Detected Data	0.289
CV of Detected Data	0.19
Skewness of Detected Data	1.723
Mean of Detected log data	0.405
SD of Detected Log data	0.182

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	1.406
SD	0.168
Standard Error of Mean	0.0727
95% KM (t) UCL	1.544
95% KM (z) UCL	1.526
95% KM (BCA) UCL	1.85
95% KM (Percentile Bootstrap) UCL	1.85
95% KM (Chebyshev) UCL	1.723
97.5% KM (Chebyshev) UCL	1.86
99% KM (Chebyshev) UCL	2.129

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.440**
[per recommendation in ProUCL User Guide]

Arsenic

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	3.39
Maximum Detected	5.01
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.28
Maximum Non-detect	0.37
Mean of Detected Data	4.373
Median of Detected Data	4.72
Variance of Detected Data	0.746
SD of Detected Data	0.864
CV of Detected Data	0.198
Skewness of Detected Data	-1.515
Mean of Detected log data	1.461
SD of Detected Log data	0.21

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	3.759
SD	0.643
Standard Error of Mean	0.278
95% KM (t) UCL	4.286
95% KM (z) UCL	4.217
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	5.01
95% KM (Chebyshev) UCL	4.972
97.5% KM (Chebyshev) UCL	5.497
99% KM (Chebyshev) UCL	6.528

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.335**
[per recommendation in ProUCL User Guide]

Barium

Number of Valid Observations	8
Number of Distinct Observations	7
Minimum	108
Maximum	417
Mean	198.6
Median	128.5
SD	119.4
Variance	14249
Coefficient of Variation	0.601
Skewness	1.058
Mean of log data	5.149
SD of log data	0.553

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	278.6
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	284.9
95% Modified-t UCL	281.2
Non-Parametric UCLs	
95% CLT UCL	268
95% Jackknife UCL	278.6
95% Standard Bootstrap UCL	262.3
95% Bootstrap-t UCL	330.7
95% Hall's Bootstrap UCL	259.7
95% Percentile Bootstrap UCL	265.3
95% BCA Bootstrap UCL	272.6
95% Chebyshev(Mean, Sd) UCL	382.6
97.5% Chebyshev(Mean, Sd) UCL	462.2

99% Chebyshev(Mean, Sd) UCL	618.5

Potential UCL to Use
Use 95% Chebyshev (Mean, Sd) UCL **382.6**

Benzo(b)fluoranthene

Total Number of Data	8
Number of Non-Detect Data	2
Number of Detected Data	**6**
Minimum Detected	0.0293
Maximum Detected	0.106
Percent Non-Detects	**25.00%**
Minimum Non-detect	0.01
Maximum Non-detect	0.011
Mean of Detected Data	0.0618
Median of Detected Data	0.0597
Variance of Detected Data	0.00112
SD of Detected Data	0.0334
CV of Detected Data	0.541
Skewness of Detected Data	0.232
Mean of Detected log data	-2.919
SD of Detected Log data	0.579

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	0.579
Mean	0.0506
SD	0.027
95% Winsor (t) UCL	0.073
Kaplan Meier (KM) Method	
Mean	0.0537
SD	0.0299
Standard Error of Mean	0.0116
95% KM (t) UCL	0.0756
95% KM (z) UCL	0.0727
95% KM (BCA) UCL	0.0746
95% KM (Percentile Bootstrap) UCL	0.0746
95% KM (Chebyshev) UCL	0.104
97.5% KM (Chebyshev) UCL	0.126
99% KM (Chebyshev) UCL	0.169

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median =** **<0.0338**
[per recommendation in ProUCL User Guide]

Benzo(g,h,i)perylene

Total Number of Data	8

Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.135
Maximum Detected	0.135
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.015
Maximum Non-detect	0.02

Data set has all detected values equal to = 0.135, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.135

**** Instead of UCL, EPC is selected to be median = <0.0159**
[per recommendation in ProUCL User Guide]

Benzo(k)fluoranthene

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	0.11
Maximum Detected	0.13
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.023
Maximum Non-detect	0.03
Mean of Detected Data	0.12
Median of Detected Data	0.119
Variance of Detected Data	1.00E-04
SD of Detected Data	0.01
CV of Detected Data	0.0837
Skewness of Detected Data	0.298
Mean of Detected log data	-2.125
SD of Detected Log data	0.0836

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.114
SD	0.00685
Standard Error of Mean	0.00297
95% KM (t) UCL	0.119
95% KM (z) UCL	0.119
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.13
95% KM (Chebyshev) UCL	0.127

97.5% KM (Chebyshev) UCL	0.132
99% KM (Chebyshev) UCL	0.143

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0275**
[per recommendation in ProUCL User Guide]

Beryllium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	0.58
Maximum	1.13
Mean	0.834
Median	0.865
SD	0.206
Variance	0.0423
Coefficient of Variation	0.247
Skewness	0.0408
Mean of log data	-0.209
SD of log data	0.254

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**0.972**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	0.954
95% Modified-t UCL	0.972
Non-Parametric UCLs	
95% CLT UCL	0.953
95% Jackknife UCL	0.972
95% Standard Bootstrap UCL	0.946
95% Bootstrap-t UCL	0.979
95% Hall's Bootstrap UCL	0.938
95% Percentile Bootstrap UCL	0.944
95% BCA Bootstrap UCL	0.946
95% Chebyshev(Mean, Sd) UCL	1.151
97.5% Chebyshev(Mean, Sd) UCL	1.288
99% Chebyshev(Mean, Sd) UCL	1.557

Data appear Normal (0.05)
May want to try Normal UCLs

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beta-BHC

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.000699
Maximum Detected	0.000699
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00049
Maximum Non-detect	0.03

Data set has all detected values equal to = 6.9900E-4, having '0' variation.

No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 6.9900E-4

**** Instead of UCL, EPC is selected to be median = <0.0230**
[per recommendation in ProUCL User Guide]

Boron

Total Number of Data	8
Number of Non-Detect Data	3
Number of Detected Data	**5**
Minimum Detected	11
Maximum Detected	28.4
Percent Non-Detects	**37.50%**
Minimum Non-detect	8.52
Maximum Non-detect	9.89

Mean of Detected Data	21.12
Median of Detected Data	25
Variance of Detected Data	65.87
SD of Detected Data	8.116
CV of Detected Data	0.384
Skewness of Detected Data	-0.574
Mean of Detected log data	2.98
SD of Detected Log data	0.438

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	17.33
SD	7.546
Standard Error of Mean	2.983
95% KM (t) UCL	22.98
95% KM (z) UCL	22.23
95% KM (BCA) UCL	26.33
95% KM (Percentile Bootstrap) UCL	26.28
95% KM (Chebyshev) UCL	30.33
97.5% KM (Chebyshev) UCL	35.95
99% KM (Chebyshev) UCL	47

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <12.4**
[per recommendation in ProUCL User Guide]

Bromomethane

Total Number of Data	8
Number of Non-Detect Data	6

Number of Detected Data	**2**
Minimum Detected	0.014
Maximum Detected	0.031
Percent Non-Detects	**75.00%**
'Minimum Non-detect	0.00264
Maximum Non-detect	0.017
Mean of Detected Data	0.0225
Median of Detected Data	0.0225
Variance of Detected Data	1.45E-04
SD of Detected Data	0.012
CV of Detected Data	0.534
Skewness of Detected Data	N/A
Mean of Detected log data	-3.871
SD of Detected Log data	0.562

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	7
Number treated as Detected	1
Single DL Percent Detection	87.50%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0161
SD	0.00562
Standard Error of Mean	0.00281
95% KM (t) UCL	0.0215
95% KM (z) UCL	0.0207
95% KM (BCA) UCL	0.031
95% KM (Percentile Bootstrap) UCL	0.031
95% KM (Chebyshev) UCL	0.0284
97.5% KM (Chebyshev) UCL	0.0337
99% KM (Chebyshev) UCL	0.0441
Potential UCL to Use	
95% KM (t) UCL	0.0215
95% KM (% Bootstrap) UCL	0.031

**** Instead of UCL, EPC is selected to be median = <0.0135**
[per recommendation in ProUCL User Guide]

Cadmium

Total Number of Data 8

Number of Non-Detect Data	3
Number of Detected Data	**5**
Minimum Detected	0.19
Maximum Detected	0.27
Percent Non-Detects	**37.50%**
Minimum Non-detect	0.03
Maximum Non-detect	0.034

Mean of Detected Data	0.226
Median of Detected Data	0.23
Variance of Detected Data	0.00128
SD of Detected Data	0.0358
CV of Detected Data	0.158
Skewness of Detected Data	0.0524
Mean of Detected log data	-1.497
SD of Detected Log data	0.16

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A

Kaplan Meier (KM) Method	
Mean	0.213
SD	0.0307
Standard Error of Mean	0.0121
95% KM (t) UCL	0.236
95% KM (z) UCL	0.232
95% KM (BCA) UCL	0.24
95% KM (Percentile Bootstrap) UCL	0.243
95% KM (Chebyshev) UCL	0.265
97.5% KM (Chebyshev) UCL	0.288
99% KM (Chebyshev) UCL	0.333

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median =** **<0.190**
[per recommendation in ProUCL User Guide]

Carbon disulfide

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.00771
Maximum Detected	0.00771
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00019
Maximum Non-detect	0.00205

Data set has all detected values equal to = 0.00771, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.00771

**** Instead of UCL, EPC is selected to be median = <0.00096**
[per recommendation in ProUCL User Guide]

Chromium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	8.29
Maximum	20.1
Mean	12.93
Median	11.55
SD	4.611
Variance	21.26
Coefficient of Variation	0.357
Skewness	0.57
Mean of log data	2.505
SD of log data	0.35

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**16.02**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	15.97
95% Modified-t UCL	16.08
Non-Parametric UCLs	
95% CLT UCL	15.61
95% Jackknife UCL	16.02
95% Standard Bootstrap UCL	15.51
95% Bootstrap-t UCL	16.56
95% Hall's Bootstrap UCL	15.49
95% Percentile Bootstrap UCL	15.56
95% BCA Bootstrap UCL	15.76
95% Chebyshev(Mean, Sd) UCL	20.04
97.5% Chebyshev(Mean, Sd) UCL	23.11
99% Chebyshev(Mean, Sd) UCL	29.15

Data appear Normal (0.05)
May want to try Normal UCLs

Chrysene

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0257
Maximum Detected	0.0257
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.013
Maximum Non-detect	0.017

Data set has all detected values equal to = 0.0257, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0257

**** Instead of UCL, EPC is selected to be median = <0.0140**

[per recommendation in ProUCL User Guide]

Cobalt

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	5.19
Maximum	8.99
Mean	6.939
Median	6.945
SD	1.378
Variance	1.898
Coefficient of Variation	0.199
Skewness	0.167
Mean of log data	1.92
SD of log data	0.2

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**7.862**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	7.771
95% Modified-t UCL	7.866
Non-Parametric UCLs	
95% CLT UCL	7.74
95% Jackknife UCL	7.862
95% Standard Bootstrap UCL	7.698
95% Bootstrap-t UCL	7.888
95% Hall's Bootstrap UCL	7.723
95% Percentile Bootstrap UCL	7.695
95% BCA Bootstrap UCL	7.695
95% Chebyshev(Mean, Sd) UCL	9.062
97.5% Chebyshev(Mean, Sd) UCL	9.981
99% Chebyshev(Mean, Sd) UCL	11.79

Data appear Normal (0.05)
May want to try Normal UCLs

Copper

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	8.33
Maximum	26.8
Mean	15.2
Median	12.55
SD	7.421
Variance	55.08
Coefficient of Variation	0.488
Skewness	0.836
Mean of log data	2.623
SD of log data	0.467

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**20.17**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.34
95% Modified-t UCL	20.3
Non-Parametric UCLs	
95% CLT UCL	19.51
95% Jackknife UCL	20.17
95% Standard Bootstrap UCL	19.15
95% Bootstrap-t UCL	23.41
95% Hall's Bootstrap UCL	21.13
95% Percentile Bootstrap UCL	19.25
95% BCA Bootstrap UCL	19.92
95% Chebyshev(Mean, Sd) UCL	26.64
97.5% Chebyshev(Mean, Sd) UCL	31.58
99% Chebyshev(Mean, Sd) UCL	41.31

Data appear Normal (0.05)
May want to try Normal UCLs

Iron

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	11300
Maximum	20100
Mean	15275
Median	15500
SD	3227
Variance	10416429
Coefficient of Variation	0.211
Skewness	0.139
Mean of log data	9.614
SD of log data	0.214

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**17437**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	17212
95% Modified-t UCL	17446
Non-Parametric UCLs	
95% CLT UCL	17152
95% Jackknife UCL	17437
95% Standard Bootstrap UCL	17037
95% Bootstrap-t UCL	17535
95% Hall's Bootstrap UCL	17130
95% Percentile Bootstrap UCL	17125
95% BCA Bootstrap UCL	17088
95% Chebyshev(Mean, Sd) UCL	20249
97.5% Chebyshev(Mean, Sd) UCL	22401
99% Chebyshev(Mean, Sd) UCL	26629

Data appear Normal (0.05)
May want to try Normal UCLs

Lead

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	10.6
Maximum	30.5
Mean	17.54
Median	15.5
SD	7.076
Variance	50.07
Coefficient of Variation	0.403
Skewness	0.923
Mean of log data	2.798
SD of log data	0.384

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**22.28**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	22.52
95% Modified-t UCL	22.41
Non-Parametric UCLs	
95% CLT UCL	21.65
95% Jackknife UCL	22.28
95% Standard Bootstrap UCL	21.32
95% Bootstrap-t UCL	23.59
95% Hall's Bootstrap UCL	23.41
95% Percentile Bootstrap UCL	21.54
95% BCA Bootstrap UCL	22.34
95% Chebyshev(Mean, Sd) UCL	28.44
97.5% Chebyshev(Mean, Sd) UCL	33.16
99% Chebyshev(Mean, Sd) UCL	42.43

Data appear Normal (0.05)
May want to try Normal UCLs

Lithium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	13.5
Maximum	23.7
Mean	18.48
Median	18.85
SD	4.071
Variance	16.58
Coefficient of Variation	0.22
Skewness	0.00369
Mean of log data	2.895
SD of log data	0.225

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**21.2**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	20.84
95% Modified-t UCL	21.2
Non-Parametric UCLs	
95% CLT UCL	20.84
95% Jackknife UCL	21.2
95% Standard Bootstrap UCL	20.65
95% Bootstrap-t UCL	21.12
95% Hall's Bootstrap UCL	20.4
95% Percentile Bootstrap UCL	20.68
95% BCA Bootstrap UCL	20.68
95% Chebyshev(Mean, Sd) UCL	24.75
97.5% Chebyshev(Mean, Sd) UCL	27.46
99% Chebyshev(Mean, Sd) UCL	32.8

Data appear Normal (0.05)
May want to try Normal UCLs

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m,p-Cresol

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.0375
Maximum Detected	0.0375
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.021
Maximum Non-detect	0.0253

Data set has all detected values equal to = 0.0375, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.0375

**** Instead of UCL, EPC is selected to be median =** **<0.0234**
[per recommendation in ProUCL User Guide]

Manganese

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	352
Maximum	711
Mean	487.6
Median	453
SD	124.2
Variance	15417
Coefficient of Variation	0.255
Skewness	0.739
Mean of log data	6.162
SD of log data	0.247

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**570.8**

95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	572.1
95% Modified-t UCL	572.7
Non-Parametric UCLs	
95% CLT UCL	559.8
95% Jackknife UCL	570.8
95% Standard Bootstrap UCL	556.5
95% Bootstrap-t UCL	599
95% Hall's Bootstrap UCL	572.9
95% Percentile Bootstrap UCL	556
95% BCA Bootstrap UCL	563.6
95% Chebyshev(Mean, Sd) UCL	679
97.5% Chebyshev(Mean, Sd) UCL	761.8
99% Chebyshev(Mean, Sd) UCL	924.4

Data appear Normal (0.05)
May want to try Normal UCLs

Methyl iodide

Total Number of Data	8
Number of Non-Detect Data	7
Number of Detected Data	**1**
Minimum Detected	0.041
Maximum Detected	0.041
Percent Non-Detects	**87.50%**
Minimum Non-detect	0.00159
Maximum Non-detect	0.017

Data set has all detected values equal to = 0.041, having '0' variation.
No reliable or meaningful statistics and estimates can be computed using such a data set.
All relevant statistics such as background statistics (UPLs, UTLs) and UCLs should also be nondetects
Specifically, UPLs, UCLs, UTLs are all less than the maximum detection limit = 0.041

**** Instead of UCL, EPC is selected to be median = <0.00784**
[per recommendation in ProUCL User Guide]

Molybdenum

Total Number of Data	8
Number of Non-Detect Data	6
Number of Detected Data	**2**
Minimum Detected	0.21
Maximum Detected	0.6
Percent Non-Detects	**75.00%**
Minimum Non-detect	0.11
Maximum Non-detect	0.14
Mean of Detected Data	0.405
Median of Detected Data	0.405
Variance of Detected Data	0.0761
SD of Detected Data	0.276
CV of Detected Data	0.681
Skewness of Detected Data	N/A
Mean of Detected log data	-1.036
SD of Detected Log data	0.742

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
the Largest DL value is used for all NDs

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data do not follow a Discernable Distribution (0.05)

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.259
SD	0.129
Standard Error of Mean	0.0645
95% KM (t) UCL	0.381
95% KM (z) UCL	0.365
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.6
95% KM (Chebyshev) UCL	0.54
97.5% KM (Chebyshev) UCL	0.661
99% KM (Chebyshev) UCL	0.9
Potential UCL to Use	
95% KM (t) UCL	0.381
95% KM (% Bootstrap) UCL	0.6

**** Instead of UCL, EPC is selected to be median = <0.12**
[per recommendation in ProUCL User Guide]

Nickel

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	12.3
Maximum	20.6
Mean	16.33
Median	16.65
SD	3.09
Variance	9.551
Coefficient of Variation	0.189
Skewness	-0.0427
Mean of log data	2.777
SD of log data	0.193

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**18.4**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	18.1
95% Modified-t UCL	18.39

Non-Parametric UCLs	
95% CLT UCL	18.12
95% Jackknife UCL	18.4
95% Standard Bootstrap UCL	17.98
95% Bootstrap-t UCL	18.4
95% Hall's Bootstrap UCL	17.86
95% Percentile Bootstrap UCL	17.88
95% BCA Bootstrap UCL	17.96
95% Chebyshev(Mean, Sd) UCL	21.09
97.5% Chebyshev(Mean, Sd) UCL	23.15
99% Chebyshev(Mean, Sd) UCL	27.2

Data appear Normal (0.05)
May want to try Normal UCLs

Pyrene

Total Number of Data	8
Number of Non-Detect Data	5
Number of Detected Data	**3**
Minimum Detected	0.0201
Maximum Detected	0.0265
Percent Non-Detects	**62.50%**
Minimum Non-detect	0.018
Maximum Non-detect	0.023
Mean of Detected Data	0.0232
Median of Detected Data	0.0231
Variance of Detected Data	1.03E-05
SD of Detected Data	0.0032
CV of Detected Data	0.138
Skewness of Detected Data	0.187
Mean of Detected log data	-3.769
SD of Detected Log data	0.138

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest DL are treated as NDs

Number treated as Non-Detect	6
Number treated as Detected	2
Single DL Percent Detection	75.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Data Dsitribution Test with Detected Values Only
Data appear Normal at 5% Significance Level

Winsorization Method	N/A
Kaplan Meier (KM) Method	
Mean	0.0213
SD	0.00221
Standard Error of Mean	9.55E-04
95% KM (t) UCL	0.0231
95% KM (z) UCL	0.0228
95% KM (BCA) UCL	0.0265

95% KM (Percentile Bootstrap) UCL	0.0265
95% KM (Chebyshev) UCL	0.0254
97.5% KM (Chebyshev) UCL	0.0272
99% KM (Chebyshev) UCL	0.0308

Data appear Normal (0.05)
May want to try Normal UCLs

**** Instead of UCL, EPC is selected to be median = <0.0196**
[per recommendation in ProUCL User Guide]

Strontium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	63.3
Maximum	181
Mean	103.6
Median	89.45
SD	41.82
Variance	1749
Coefficient of Variation	0.404
Skewness	1
Mean of log data	4.575
SD of log data	0.38

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs

Student's-t UCL	**131.6**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	133.5
95% Modified-t UCL	132.5
Non-Parametric UCLs	
95% CLT UCL	127.9
95% Jackknife UCL	131.6
95% Standard Bootstrap UCL	126
95% Bootstrap-t UCL	151.9
95% Hall's Bootstrap UCL	138.6
95% Percentile Bootstrap UCL	127
95% BCA Bootstrap UCL	130.3
95% Chebyshev(Mean, Sd) UCL	168.1
97.5% Chebyshev(Mean, Sd) UCL	195.9
99% Chebyshev(Mean, Sd) UCL	250.7

Data appear Normal (0.05)
May want to try Normal UCLs

Titanium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	19.1
Maximum	40.5
Mean	30
Median	32.65
SD	8.035
Variance	64.57

Coefficient of Variation	0.268
Skewness	-0.263
Mean of log data	3.367
SD of log data	0.286

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**35.38**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	34.39
95% Modified-t UCL	35.34
Non-Parametric UCLs	
95% CLT UCL	34.67
95% Jackknife UCL	35.38
95% Standard Bootstrap UCL	34.3
95% Bootstrap-t UCL	35.29
95% Hall's Bootstrap UCL	33.72
95% Percentile Bootstrap UCL	34.38
95% BCA Bootstrap UCL	34.13
95% Chebyshev(Mean, Sd) UCL	42.38
97.5% Chebyshev(Mean, Sd) UCL	47.74
99% Chebyshev(Mean, Sd) UCL	58.27

Data appear Normal (0.05)
May want to try Normal UCLs

Vanadium

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	16.8
Maximum	27.4
Mean	21.83
Median	21.8
SD	4.107
Variance	16.87
Coefficient of Variation	0.188
Skewness	0.0796
Mean of log data	3.067
SD of log data	0.19

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

95% Useful UCLs	
Student's-t UCL	**24.58**
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	24.26
95% Modified-t UCL	24.58
Non-Parametric UCLs	
95% CLT UCL	24.21
95% Jackknife UCL	24.58
95% Standard Bootstrap UCL	24.04
95% Bootstrap-t UCL	24.41

95% Hall's Bootstrap UCL	23.81
95% Percentile Bootstrap UCL	24.04
95% BCA Bootstrap UCL	24.15
95% Chebyshev(Mean, Sd) UCL	28.15
97.5% Chebyshev(Mean, Sd) UCL	30.89
99% Chebyshev(Mean, Sd) UCL	36.27

Data appear Normal (0.05)
May want to try Normal UCLs

Zinc

Number of Valid Observations	8
Number of Distinct Observations	8
Minimum	38.2
Maximum	999
Mean	332.3
Median	55.65
SD	407.7
Variance	166239
Coefficient of Variation	1.227
Skewness	0.879
Mean of log data	4.894
SD of log data	1.489

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions
The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Data do not follow a Discernable Distribution

95% Useful UCLs	
Student's-t UCL	605.4
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL	617.3
95% Modified-t UCL	612.9
Non-Parametric UCLs	
95% CLT UCL	569.4
95% Jackknife UCL	605.4
95% Standard Bootstrap UCL	557.3
95% Bootstrap-t UCL	767.6
95% Hall's Bootstrap UCL	474.7
95% Percentile Bootstrap UCL	549.9
95% BCA Bootstrap UCL	591.4
95% Chebyshev(Mean, Sd) UCL	**960.7**
97.5% Chebyshev(Mean, Sd) UCL	1233
99% Chebyshev(Mean, Sd) UCL	1767
Potential UCL to Use	
99% Chebyshev(Mean, Sd) UCL	1767
Recommended UCL exceeds the maximum observation	

APPENDIX B

BACKGROUND COMPARISONS

APPENDIX B-1

BACKGROUND COMPARISONS

SOUTH OF MARLIN SURFACE SOIL

ANTIMONY - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.118	1.228	83	0.953	0.878	10

Calculated Difference =	0.165	
Standard Error of the Difference =	0.407177285	
Degree of Freedom =	91	
t =	0.405228892	
p =	0.3445	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	background mean is not statistically less than site mean

ARSENIC - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	3.735	4.012	83	3.438	1.792	10

Calculated Difference =	0.297	
Standard Error of the Difference =	1.126036589	
Degree of Freedom =	91	
t =	0.263756971	
p =	0.3963	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

BARIUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	345.2	349	83	333.1	288.1	10

Calculated Difference =	12.1	
Standard Error of the Difference =	124.3580544	
Degree of Freedom =	91	
t =	0.097299689	
p =	0.4614	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

CADMIUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.464	1.141	83	0.0311	0.0398	10

Calculated Difference =	0.4329	
Standard Error of the Difference =	0.277019204	
Degree of Freedom =	91	
t =	1.562707545	
p =	0.0608	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

CHROMIUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	16.08	15.7	83	15.2	3.02	10

Calculated Difference =	0.88	
Standard Error of the Difference =	3.925742193	
Degree of Freedom =	91	
t =	0.224161434	
p =	0.4116	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

COPPER - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	27.98	35.35	83	12.12	3.955	10

Calculated Difference =	15.86	
Standard Error of the Difference =	8.664375822	
Degree of Freedom =	91	
t =	1.830483849	
p =	0.0353	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

LEAD - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	69.61	112.8	83	13.43	1.547	10

Calculated Difference =	56.18	
Standard Error of the Difference =	27.36239203	
Degree of Freedom =	91	
t =	2.053183068	
p =	0.0215	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

LITHIUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	7.856	5.715	83	21.14	5.166	10

Calculated Difference =	13.284	
Standard Error of the Difference =	2.142429492	
Degree of Freedom =	91	
t =	6.200437423	
p =	0.00	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MANGANESE - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	257.4	129.3	83	377.4	93.75	10

Calculated Difference =	120	
Standard Error of the Difference =	43.15491673	
Degree of Freedom =	91	
t =	2.780679679	
p =	0.0033	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MERCURY - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0227	0.0752	83	0.0213	0.00479	10

Calculated Difference =	0.0014	
Standard Error of the Difference =	0.01830147	
Degree of Freedom =	91	
t =	0.076496585	
p =	0.4698	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

MOLYBDENUM - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	1.306	1.588	83	0.522	0.0739	10

Calculated Difference =	0.784	
Standard Error of the Difference =	0.385854899	
Degree of Freedom =	91	
t =	2.031851873	
p =	0.0225	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

ZINC - SOUTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	601.2	672.8	83	247	364.6	10

Calculated Difference =	354.2	
Standard Error of the Difference =	199.8008143	
Degree of Freedom =	91	
t =	1.772765547	
p =	0.0399	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

APPENDIX B-2

BACKGROUND COMPARISONS

SOUTH OF MARLIN SOIL

ANTIMONY - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.023	1.14	166	0.953	0.878	10

Calculated Difference =	0.07	
Standard Error of the Difference =	0.39183601	
Degree of Freedom =	174	
t =	0.178646164	
p =	0.4292	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	background mean is not statistically less than site mean

ARSENIC - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	3.331	3.269	166	3.438	1.792	10

Calculated Difference =	0.107	
Standard Error of the Difference =	0.97454393	
Degree of Freedom =	174	
t =	0.109794948	
p =	0.4563	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

BARIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	237.4	274.8	166	333.1	288.1	10

Calculated Difference =	95.7	
Standard Error of the Difference =	112.8814519	
Degree of Freedom =	174	
t =	0.847792072	
p =	0.1989	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

CADMIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.335	0.859	166	0.0311	0.0398	10

Calculated Difference =	0.3039	
Standard Error of the Difference =	0.208717917	
Degree of Freedom =	174	
t =	1.456032165	
p =	0.0736	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

CHROMIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	13.53	12.49	166	15.2	3.02	10

Calculated Difference =	1.67	
Standard Error of the Difference =	3.176242508	
Degree of Freedom =	174	
t =	0.525778493	
p =	0.2998	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

COPPER - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	24.26	46.76	166	12.12	3.955	10

Calculated Difference =	12.14	
Standard Error of the Difference =	11.40971991	
Degree of Freedom =	174	
t =	1.064005085	
p =	0.1444	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	53.52	104.2	166	13.43	1.547	10

Calculated Difference =	40.09	
Standard Error of the Difference =	25.27694655	
Degree of Freedom =	174	
t =	1.586030177	
p =	0.0573	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	10.03	6.299	166	21.14	5.166	10

Calculated Difference =	11.11	
Standard Error of the Difference =	2.236676187	
Degree of Freedom =	174	
t =	4.967191972	
p =	0.00	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MANGANESE - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	261.2	127.4	166	377.4	93.75	10

Calculated Difference =	116.2	
Standard Error of the Difference =	42.82121949	
Degree of Freedom =	174	
t =	2.713607912	
p =	0.0037	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MERCURY - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0262	0.0941	166	0.0213	0.00479	10

Calculated Difference =	0.0049	
Standard Error of the Difference =	0.022872813	
Degree of Freedom =	174	
t =	0.214228129	
p =	0.4153	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

MOLYBDENUM - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.89	1.488	166	0.522	0.0739	10

Calculated Difference =	0.368	
Standard Error of the Difference =	0.361648843	
Degree of Freedom =	174	
t =	1.017561668	
p =	0.1550	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ZINC - SOUTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	433.8	786.8	166	247	364.6	10

Calculated Difference =	186.8	
Standard Error of the Difference =	222.9535182	
Degree of Freedom =	174	
t =	0.8378428	
p =	0.2016	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

APPENDIX B-3

BACKGROUND COMPARISONS

NORTH OF MARLIN SURFACE SOIL

ANTIMONY - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.744	2.146	18	0.953	0.878	10

Calculated Difference =	0.791	
Standard Error of the Difference =	0.589906214	
Degree of Freedom =	26	
t =	1.340891114	
p =	0.0958	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ARSENIC - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	2.522	1.164	18	3.438	1.792	10

Calculated Difference =	0.916	
Standard Error of the Difference =	0.633108336	
Degree of Freedom =	26	
t =	1.446829789	
p =	0.0799	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

BARIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	145.2	115.8	18	333.1	288.1	10

Calculated Difference =	187.9	
Standard Error of the Difference =	95.33605484	
Degree of Freedom =	26	
t =	1.970922756	
p =	0.0297	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

CADMIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.207	0.252	18	0.0311	0.0398	10

Calculated Difference =	0.1759	
Standard Error of the Difference =	0.06240139	
Degree of Freedom =	26	
t =	2.818847487	
p =	0.0045	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

CHROMIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	20.26	27.58	18	15.2	3.02	10

Calculated Difference =	5.06	
Standard Error of the Difference =	6.7569619	
Degree of Freedom =	26	
t =	0.748857264	
p =	0.2303	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

COPPER - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	24.13	44.66	18	12.12	3.955	10

Calculated Difference =	12.01	
Standard Error of the Difference =	10.90360718	
Degree of Freedom =	26	
t =	1.101470348	
p =	0.1405	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	57.7	111.1	18	13.43	1.547	10

Calculated Difference =	44.27	
Standard Error of the Difference =	26.95014837	
Degree of Freedom =	26	
t =	1.64266257	
p =	0.0562	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	16.57	5.136	18	21.14	5.166	10

Calculated Difference =	4.57	
Standard Error of the Difference =	2.054368963	
Degree of Freedom =	26	
t =	2.224527377	
p =	0.0175	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

MANGANESE - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	369.5	247.7	18	377.4	93.75	10

Calculated Difference =	7.9	
Standard Error of the Difference =	66.99284257	
Degree of Freedom =	26	
t =	0.117923045	
p =	0.4535	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MERCURY - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0126	0.0163	18	0.0213	0.00479	10

Calculated Difference =	0.0087	
Standard Error of the Difference =	0.004233584	
Degree of Freedom =	26	
t =	2.054996426	
p =	0.0250	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

MOLYBDENUM - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.949	2.5	18	0.522	0.0739	10

Calculated Difference =	0.427	
Standard Error of the Difference =	0.606789238	
Degree of Freedom =	26	
t =	0.703703977	
p =	0.2439	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ZINC - NORTH OF MARLIN SURFACE SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	418.4	1308	18	247	364.6	10

Calculated Difference =	171.4	
Standard Error of the Difference =	337.5387012	
Degree of Freedom =	26	
t =	0.507793623	
p =	0.3080	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

APPENDIX B-4

BACKGROUND COMPARISONS

NORTH OF MARLIN SOIL

ANTIMONY - NORTH OF MARLIN SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.416	1.779	36	0.953	0.878	10

Calculated Difference =	0.463	
Standard Error of the Difference =	0.513084318	
Degree of Freedom =	44	
t =	0.902385794	
p =	0.1859	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ARSENIC - NORTH OF MARLIN SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	2.573	1.369	36	3.438	1.792	10

Calculated Difference =	0.865	
Standard Error of the Difference =	0.656788524	
Degree of Freedom =	44	
t =	1.317014486	
p =	0.0973	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

BARIUM - NORTH OF MARLIN SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	142.1	95.9	36	333.1	288.1	10

Calculated Difference =	191	
Standard Error of the Difference =	94.02738869	
Degree of Freedom =	44	
t =	2.031323029	
p =	0.0242	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

CADMIUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc Standard Deviation	Number of Background Samples
Cadmium	0.193	0.239	36	0.0311	0.0398	10

Calculated Difference =	0.1619	
Standard Error of the Difference =	0.059316632	
Degree of Freedom =	44	
t =	2.729419974	
p =	0.0045	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

CHROMIUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	17.17	19.6	36	15.2	3.02	10

Calculated Difference =	1.97	
Standard Error of the Difference =	4.848678898	
Degree of Freedom =	44	
t =	0.406296239	
p =	0.3432	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

COPPER - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	18.7	31.9	36	12.12	3.955	10

Calculated Difference =	6.58	
Standard Error of the Difference =	7.837321881	
Degree of Freedom =	44	
t =	0.83957251	
p =	0.2028	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	37.8	80.99	36	13.43	1.547	10

Calculated Difference =	24.37	
Standard Error of the Difference =	19.6490511	
Degree of Freedom =	44	
t =	1.240263455	
p =	0.1108	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	18.84	5.952	36	21.14	5.166	10

Calculated Difference =	2.3	
Standard Error of the Difference =	2.180058677	
Degree of Freedom =	44	
t =	1.055017475	
p =	0.1486	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MANGANESE - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	347	204.1	36	377.4	93.75	10

Calculated Difference =	30.4	
Standard Error of the Difference =	57.70014591	
Degree of Freedom =	44	
t =	0.526861753	
p =	0.3005	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MERCURY - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0094	0.0124	36	0.0213	0.00479	10

Calculated Difference =	0.0119	
Standard Error of the Difference =	0.00336736	
Degree of Freedom =	44	
t =	3.533925295	
p =	0.0005	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

MOLYBDENUM - NORTH OF MARLIN SOIL						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.586	1.788	36	0.522	0.0739	10

Calculated Difference =	0.064	
Standard Error of the Difference =	0.434282915	
Degree of Freedom =	44	
t =	0.147369371	
p =	0.4417	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ZINC - NORTH OF MARLIN SOIL

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	242.5	929.4	36	247	364.6	10

Calculated Difference =	4.5	
Standard Error of the Difference =	253.1879948	
Degree of Freedom =	44	
t =	0.017773355	
p =	0.4929	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

APPENDIX B-5

BACKGROUND COMPARISONS

INTRACOASTAL WATERWAY SEDIMENT

4,4'-DDT - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
4,4'-DDT	0.00041103	0.0007962	17	0.0001555	0.00015569	9

Calculated Difference =	0.00025553	
Standard Error of the Difference =	0.000199284	
Degree of Freedom =	24	
t =	1.28223903	
p =	0.106	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ALUMINUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Aluminum	6854	2346	16	12213	6892	9

Calculated Difference =	5359	
Standard Error of the Difference =	2252.49071	
Degree of Freedom =	23	
t =	2.379144107	
p =	0.013	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ANTIMONY - INTRACOASTAL WATERWAY SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	2.245	1.751	16	4.023	2.215	9

Calculated Difference =	1.778	
Standard Error of the Difference =	0.819130942	
Degree of Freedom =	23	
t =	2.170593136	
p =	0.0203	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ARSENIC - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	4.026	1.4	16	5.813	3.107	9

Calculated Difference =	1.787	
Standard Error of the Difference =	1.039537887	
Degree of Freedom =	23	
t =	1.719033066	
p =	0.0495	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

BARIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	215.3	59.65	16	209.7	47.73	9

Calculated Difference =	5.6	
Standard Error of the Difference =	20.90733397	
Degree of Freedom =	23	
t =	0.267848594	
p =	0.3956	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

BENZO(B)FLUORANTHENE - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Benzo(b)fluoranthene	0.1	0.157	16	0.0087	0.0106	9

Calculated Difference =	0.0913	
Standard Error of the Difference =	0.038225347	
Degree of Freedom =	23	
t =	2.388467508	
p =	0.5	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

BERYLLIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Beryllium	0.463	0.149	16	0.766	0.403	9

Calculated Difference =	0.303	
Standard Error of the Difference =	0.13246449	
Degree of Freedom =	23	
t =	2.287405473	
p =	0.0159	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

BORON - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Boron	12.04	9.92	16	27.64	12.82	9

Calculated Difference =	15.6	
Standard Error of the Difference =	4.714218044	
Degree of Freedom =	23	
t =	3.30913841	
p =	0.0015	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

COBALT - INTRACOASTAL WATERWAY SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cobalt	4.385	1.131	16	6.698	3.165	9

Calculated Difference =	2.313	
Standard Error of the Difference =	1.037770333	
Degree of Freedom =	23	
t =	2.228816845	
p =	0.0179	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

COPPER - INTRACOASTAL WATERWAY SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	7.112	2.997	16	8.138	5.165	9

Calculated Difference =	1.026	
Standard Error of the Difference =	1.787757246	
Degree of Freedom =	23	
t =	0.573903421	
p =	0.2858	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

IRON - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Iron	13352	5546	16	16496	8097	9

Calculated Difference =	3144	
Standard Error of the Difference =	2892.307356	
Degree of Freedom =	23	
t =	1.087021403	
p =	0.1441	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

LEAD - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	11.56	7.161	16	9.587	3.602	9

Calculated Difference =	1.973	
Standard Error of the Difference =	2.076994545	
Degree of Freedom =	23	
t =	0.949930275	
p =	0.1760	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LITHIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	10.53	3.559	16	21.4	14.41	9

Calculated Difference =	10.87	
Standard Error of the Difference =	4.637876359	
Degree of Freedom =	23	
t =	2.343745102	
p =	0.0141	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

MANGANESE - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	283.3	87.59	16	330.7	88.99	9

Calculated Difference =	47.4	
Standard Error of the Difference =	35.25927685	
Degree of Freedom =	23	
t =	1.34432706	
p =	0.0960	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MERCURY - INTRACOASTAL WATERWAY SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0201	0.0073	16	0.0176	0.0132	9

Calculated Difference =	0.0025	
Standard Error of the Difference =	0.004534171	
Degree of Freedom =	23	
t =	0.551368717	
p =	0.5000	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

MOLYBDENUM - INTRACOASTAL WATERWAY SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.667	1.358	16	0.241	0.0675	9

Calculated Difference =	0.426	
Standard Error of the Difference =	0.330054329	
Degree of Freedom =	23	
t =	1.290696598	
p =	0.1048	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

NICKEL - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Nickel	9.589	2.741	16	14.91	8.111	9

Calculated Difference =	5.321	
Standard Error of the Difference =	2.649675082	
Degree of Freedom =	23	
t =	2.008170751	
p =	0.5000	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

STRONTIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Strontium	44.86	14.43	16	59.17	22.06	9

Calculated Difference =	14.31	
Standard Error of the Difference =	7.804670623	
Degree of Freedom =	23	
t =	1.833517478	
p =	0.0398	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

TITANIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Titanium	25.58	5.051	16	31.79	10.49	9

Calculated Difference =	6.21	
Standard Error of the Difference =	3.536205768	
Degree of Freedom =	23	
t =	1.756119527	
p =	0.0462	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

VANADIUM - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Vanadium	13.86	3.523	16	20.21	9.135	9

Calculated Difference =	6.35	
Standard Error of the Difference =	3.012459534	
Degree of Freedom =	23	
t =	2.107912133	
p =	0.0231	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ZINC - INTRACOASTAL WATERWAY SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	45.36	19.88	16	36.04	13.68	9

Calculated Difference =	9.32	
Standard Error of the Difference =	6.477819531	
Degree of Freedom =	23	
t =	1.438755735	
p =	0.0818	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

APPENDIX B-6

BACKGROUND COMPARISONS

WETLAND SEDIMENT

ANTIMONY - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	1.154	0.724	47	0.953	0.878	10

Calculated Difference =	0.201	
Standard Error of the Difference =	0.32851527	
Degree of Freedom =	55	
t =	0.611843706	
p =	0.2716	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ARSENIC - WETLAND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	2.534	2.465	48	3.438	1.792	10

Calculated Difference =	0.904	
Standard Error of the Difference =	0.823742314	
Degree of Freedom =	56	
t =	1.097430573	
p =	0.1387	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

BARIUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	151.7	136.5	48	333.1	288.1	10

Calculated Difference =	181.4	
Standard Error of the Difference =	96.93387285	
Degree of Freedom =	56	
t =	1.871378855	
p =	0.0333	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically less than background mean

CADMIUM - WETLAND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.103	0.146	48	0.0311	0.0398	10

Calculated Difference =	0.0719	
Standard Error of the Difference =	0.037580399	
Degree of Freedom =	56	
t =	1.913231441	
p =	0.0304	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

CHROMIUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	15.07	5.536	48	15.2	3.02	10

Calculated Difference =	0.13	
Standard Error of the Difference =	1.647671726	
Degree of Freedom =	56	
t =	0.078899211	
p =	0.4687	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

COPPER - WETLAND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	14.49	8.49	48	12.12	3.955	10

Calculated Difference =	2.37	
Standard Error of the Difference =	2.409192475	
Degree of Freedom =	56	
t =	0.983732111	
p =	0.1647	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	25.36	34.13	48	13.43	1.547	10

Calculated Difference =	11.93	
Standard Error of the Difference =	8.292183972	
Degree of Freedom =	56	
t =	1.438704211	
p =	0.0779	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically greater than background mean

LITHIUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	18.65	3.754	48	21.14	5.166	10

Calculated Difference =	2.49	
Standard Error of the Difference =	1.870221145	
Degree of Freedom =	56	
t =	1.331393353	
p =	0.0943	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MANGANESE - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	331.8	205.9	48	377.4	93.75	10

Calculated Difference =	45.6	
Standard Error of the Difference =	58.07511173	
Degree of Freedom =	56	
t =	0.785190052	
p =	0.2178	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MERCURY - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Mercury	0.0199	0.0194	48	0.0213	0.00479	10

Calculated Difference =	0.0014	
Standard Error of the Difference =	0.004942998	
Degree of Freedom =	56	
t =	0.283228898	
p =	0.3890	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

MOLYBDENUM - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.581	0.677	48	0.522	0.0739	10

Calculated Difference =	0.059	
Standard Error of the Difference =	0.16585129	
Degree of Freedom =	56	
t =	0.355740374	
p =	0.3617	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

ZINC - WETLAND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	139.1	160.9	53	247	364.6	10

Calculated Difference =	107.9	
Standard Error of the Difference =	121.7217613	
Degree of Freedom =	61	
t =	0.886447902	
p =	0.1896	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

APPENDIX B-7

BACKGROUND COMPARISONS

POND SEDIMENT

ANTIMONY - POND SEDIMENT

Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Antimony	0.795	0.618	8	0.953	0.878	10

Calculated Difference =	0.158	
Standard Error of the Difference =	0.31552261	
Degree of Freedom =	16	
t =	0.500756506	
p =	0.3116	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

ARSENIC - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Arsenic	1.735	2.233	8	3.438	1.792	10

Calculated Difference =	1.703	
Standard Error of the Difference =	0.783860649	
Degree of Freedom =	16	
t =	2.172580039	
p =	0.0226	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

BARIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Barium	198.6	119.4	8	333.1	288.1	10

Calculated Difference =	134.5	
Standard Error of the Difference =	95.59691633	
Degree of Freedom =	16	
t =	1.406949148	
p =	0.0893	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site surface soil mean is not statistically less than background mean

CADMIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Cadmium	0.147	0.112	8	0.0311	0.0398	10

Calculated Difference =	0.1159	
Standard Error of the Difference =	0.029938042	
Degree of Freedom =	16	
t =	3.871328672	
p =	0.0007	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically greater than background mean

CHROMIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Chromium	12.93	4.611	8	15.2	3.02	10

Calculated Difference =	2.27	
Standard Error of the Difference =	1.470614137	
Degree of Freedom =	16	
t =	1.543572812	
p =	0.0711	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

COPPER - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Copper	15.2	7.421	8	12.12	3.955	10

Calculated Difference =	3.08	
Standard Error of the Difference =	2.191731568	
Degree of Freedom =	16	
t =	1.40528158	
p =	0.0896	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

LEAD - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lead	17.54	7.076	8	13.43	1.547	10

Calculated Difference =	4.11	
Standard Error of the Difference =	1.784545276	
Degree of Freedom =	16	
t =	2.303107719	
p =	0.0175	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

LITHIUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Lithium	18.48	4.071	8	21.14	5.166	10

Calculated Difference =	2.66	
Standard Error of the Difference =	1.908832199	
Degree of Freedom =	16	
t =	1.393522176	
p =	0.0912	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically less than background mean

MANGANESE - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Manganese	487.6	124.2	8	377.4	93.75	10

Calculated Difference =	110.2	
Standard Error of the Difference =	42.26460503	
Degree of Freedom =	16	
t =	2.607382701	
p =	0.0095	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site surface soil mean is statistically greater than background mean

MOLYBDENUM - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Molybdenum	0.146	0.191	8	0.522	0.0739	10

Calculated Difference =	0.376	
Standard Error of the Difference =	0.051885086	
Degree of Freedom =	16	
t =	7.24678375	
p =	0.0000	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	Yes	site soil mean is statistically less than background mean

ZINC - POND SEDIMENT						
Compound	Site Conc. Mean	Site Conc. Standard Deviation	Number of Site Samples	Background Conc. Mean	Background Conc. Standard Deviation	Number of Background Samples
Zinc	332.3	407.7	8	247	364.6	10

Calculated Difference =	85.3	
Standard Error of the Difference =	151.8911495	
Degree of Freedom =	16	
t =	0.561586375	
p =	0.2910	calculated at www.stat.tamu.edu/~west/applets/tdemo.html
Data sets significantly different =	No	site soil mean is not statistically greater than background mean

TABLE C-1
EXPOSURE POINT CONCENTATION (mg/kg)
SOIL SOUTH OF MARLIN AVE.*

Parameter	Exposure Point Concentration	Statistic Used
2-Methylnaphthalene	1.60E-01	95% KM (BCA)
4,4-DDD	5.08E-02	97.5% KM (Chebyshev)
4,4'-DDE	2.81E-03	95% KM (BCA)
4,4'-DDT	9.27E-03	97.5% KM (Chebyshev)
Acenaphthene	1.16E-01	97.5% KM (Chebyshev)
Acenaphthylene	7.19E-02	95% KM (BCA)
Anthracene	1.24E-01	95% KM (BCA)
Antimony	1.87E+00	97.5% KM (Chebyshev)
Aroclor-1254	7.73E-01	97.5% KM (Chebyshev)
Arsenic	4.92E+00	97.5% KM (Chebyshev)
Barium	3.30E+02	95% Chebyshev
Benzo(a)anthracene	6.43E-01	97.5% KM (Chebyshev)
Benzo(a)pyrene	7.63E-01	97.5% KM (Chebyshev)
Benzo(b)fluoranthene	8.22E-01	95% KM (Chebyshev)
Benzo(g,h,i)perylene	4.94E-01	97.5% KM (Chebyshev)
Benzo(k)fluoranthene	3.81E-01	97.5% KM (Chebyshev)
Boron	6.51E+00	95% KM (Bootstrap)
Cadmium	4.67E-01	95% KM (Bootstrap)
Chromium	1.78E+01	95% Chebyshev
Chrysene	7.12E-01	97.5% KM (Chebyshev)
Cobalt	4.35E+00	95% Winsor-t
Copper	4.01E+01	95% KM (Chebyshev)
Dibenz(a,h)anthracene	1.80E-01	95% KM (Bootstrap)
Dieldrin	2.11E-03	97.5% KM (Chebyshev)
Endrin Aldehyde	3.54E-03	95% KM (BCA)
Endrin Ketone	2.53E-03	97.5% KM (Chebyshev)
Fluoranthene	1.41E+00	97.5% KM (Chebyshev)
Fluorene	1.07E-01	97.5% KM (Chebyshev)
gamma-Chlordane	1.84E-03	97.5% KM (Chebyshev)
Indeno(1,2,3-cd)pyrene	6.58E-01	95% KM (Chebyshev)
Lead	1.04E+02	97.5% Chebyshev
Lithium	1.22E+01	95% Chebyshev
Manganese	2.78E+02	95% Student's-t
Mercury	4.00E-02	95%KM (BCA)
Molybdenum	1.62E+00	97.5% KM (Chebyshev)
Naphthalene	< 2.65E-03	median
Nickel	1.24E+01	95% Student's-t
Phenanthrene	9.99E-01	97.5% KM (Chebyshev)
Pyrene	9.71E-01	97.5% KM (Chebyshev)
Vanadium	1.73E+01	97.5% Chebyshev
Zinc	8.15E+02	97.5% Chebyshev
LPAH	1.58E+00	
HPAH	7.03E+00	
TOTAL PAHs	8.61E+00	

Notes:
* Soil data includes soil collected from 0 to 2 feet below ground surface.

TABLE C-2
EXPOSURE POINT CONCENTATION (mg/kg)
SURFACE SOIL SOUTH OF MARLIN AVE.*

Parameter	95% UCL	Statistic Used
2-Methylnaphthalene	7.90E-02	97.5% KM (Chebyshev)
4,4'-DDD	< 2.70E-04	median
4,4'-DDE	7.52E-03	97.5% KM (Chebyshev)
4,4'-DDT	1.03E-02	97.5% KM (Chebyshev)
Acenaphthene	2.00E-01	97.5% KM (Chebyshev)
Acenaphthylene	1.21E-01	97.5% KM (Chebyshev)
Anthracene	2.99E-01	97.5% KM (Chebyshev)
Antimony	2.24E+00	97.5% KM (Chebyshev)
Aroclor-1254	7.64E-01	97.5% KM (Chebyshev)
Arsenic	6.49E+00	97.5% KM (Chebyshev)
Barium	5.84E+02	97.5% KM (Chebyshev)
Benzo(a)anthracene	9.03E-01	97.5% KM (Chebyshev)
Benzo(a)pyrene	1.09E+00	97.5% KM (Chebyshev)
Benzo(b)fluoranthene	1.10E+00	95% KM (Chebyshev)
Benzo(g,h,i)perylene	7.89E-01	97.5% KM (Chebyshev)
Benzo(k)fluoranthene	6.58E-01	97.5% KM (Chebyshev)
Boron	7.07E+00	97.5% KM (Bootstrap)
Cadmium	1.25E+00	97.5% KM (Chebyshev)
Chromium	2.68E+01	97.5% Chebyshev
Chrysene	9.84E-01	97.5% KM (Chebyshev)
Cobalt	5.25E+00	97.5% KM (Chebyshev)
Copper	5.22E+01	97.5% KM (Chebyshev)
Dibenz(a,h)anthracene	2.45E-01	95% KM (Bootstrap)
Dieldrin	3.14E-03	97.5% KM (Chebyshev)
Endrin Aldehyde	8.72E-03	97.5% KM (Chebyshev)
Endrin Ketone	4.41E-03	97.5% KM (Chebyshev)
Fluoranthene	2.14E+00	97.5% KM (Chebyshev)
Fluorene	1.57E-01	97.5% KM (Chebyshev)
gamma-Chlordane	2.90E-03	97.5% KM (Chebyshev)
Indeno(1,2,3-cd)pyrene	9.31E-01	95% KM (Chebyshev)
Lead	1.47E+02	97.5% Chebyshev
Lithium	1.18E+01	97.5% Chebyshev
Manganese	2.81E+02	95% Student's-t
Mercury	7.42E-02	97.5% KM (Chebyshev)
Molybdenum	2.40E+00	97.5% KM (Chebyshev)
Naphthalene		NS
Nickel	1.50E+01	97.5% KM (Chebyshev)
Phenanthrene	1.06E+04	97.5% KM (Chebyshev)
Pyrene	1.36E+00	97.5% KM (Chebyshev)
Vanadium	1.80E+01	97.5% Chebyshev
Zinc	1.06E+03	97.5% Chebyshev
LPAH	1.06E+04	
HPAH	1.02E+01	
TOTAL PAHs	1.06E+04	

Notes:
NS - Not sampled in surface soil.
* Surface soil data includes soil collected from 0 to 0.5 feet below ground surface.

TABLE C-3
TOXICITY VALUES

Parameter	Invertebrate (Earthworm) (mg/kg)	Ref.	Comments	Small Mammalian Herbivore (Deer Mouse) (mg/kgBW-day)	Ref.	Comments	Large Mammalian Carnivore (Coyote) (mg/kgBW-day)	Ref.	Comments	Small Mammalian Omnivore (Least Shrew) (mg/kgBW-day)	Ref.	Comments	Avian Herbivore/Omnivore (American Robin) (mg/kgBW-day)	Ref.	Comments	Large Avian Carnivore (Red-tailed Hawk) (mg/kgBW-day)	Ref.	Comments
2-Methylnaphthalene																		
4,4-DDD	4.30E-02	EPA, 2007a	Acute median LC50 in common cricket (dose 4.3 with uncertainty factor of 0.01)	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
4,4'-DDE	4.30E-02	EPA, 2007a	Acute median LC50 in common cricket (dose 4.3 with uncertainty factor of 0.01)	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
4,4'-DDT	4.30E-02	EPA, 2007a	Acute median LC50 in common cricket (dose 4.3 with uncertainty factor of 0.01)	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Acenaphthene																		
Acenaphthylene																		
Anthracene																		
Antimony	3.00E+01	EPA, 2005a	EC20 for earthworms	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1						
Aroclor-1254	2.51E+00	EPA, 1999	Acute median LC50 in earthworms (dose 251 with uncertainty factor of 0.01)	1.55E-01	Sample, 1996	Chronic LOAEL for reproduction in mouse with an uncertainty factor of 0.1	1.55E-01	Sample, 1996	Chronic LOAEL for reproduction in mouse with an uncertainty factor of 0.1	1.55E-01	Sample, 1996	Chronic LOAEL for reproduction in mouse with an uncertainty factor of 0.1	1.80E-01	Sample, 1996		1.80E-01	Sample, 1996	
Arsenic	6.00E+01	TCEQ, 2006		1.85E+00	EPA, 1999		1.22E+00	EPA, 1999		2.00E+00	EPA, 1999		2.71E+00	EPA, 1999		4.46E+00	EPA, 1999	
Barium	3.30E+02	EPA, 2005g	Geometric mean of the EC20 values for three test species under three separate test conditions of pH	5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	4.10E-01	EPA, 1999		5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	1.91E+01	EPA, 1999		3.15E+01	EPA, 1999	
Benzo(a)anthracene																		
Benzo(a)pyrene																		
Benzo(b)fluoranthene																		
Benzo(g,h,i)perylene																		
Benzo(k)fluoranthene																		
Boron				3.40E+01	Sample, 1996		2.20E+01	Sample, 1996		3.70E+01	Sample, 1996		1.74E+01	Sample, 1996		2.86E+01	Sample, 1996	
Cadmium	1.00E+01	EPA, 1999	Chronic (4-month) NOAEL for cocoon production in earthworm (dose 10)	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth
Chromium	5.70E+01	EPA, 2005c	Maximum acceptable toxicant concentration (MATC) for reproductive effects in earthworm	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.66E+00	EPA, 2005c	Geometric mean of the NOAEL values for reproduction and growth	2.66E+00	EPA, 2005c	Geometric mean of the NOAEL values for reproduction and growth
Chrysene																		
Cobalt																		
Copper	8.00E+01	EPA, 2007c	Geometric mean of the MATC and EC10 values for six test species under different test species	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Dibenz(a,h)anthracene																		
Dieldrin				1.50E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.50E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.50E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.09E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.09E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival
Endrin Aldehyde				9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1
Endrin Ketone				9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1
Fluoranthene																		
Fluorene																		

TABLE C-3
TOXICITY VALUES

Parameter	Invertebrate (Earthworm) (mg/kg)	Ref.	Comments	Small Mammalian Herbivore (Deer Mouse) (mg/kgBW-day)	Ref.	Comments	Large Mammalian Carnivore (Coyote) (mg/kgBW-day)	Ref.	Comments	Small Mammalian Omnivore (Least Shrew) (mg/kgBW-day)	Ref.	Comments	Avian Herbivore/Omnivore (American Robin) (mg/kgBW-day)	Ref.	Comments	Large Avian Carnivore (Red-tailed Hawk) (mg/kgBW-day)	Ref.	Comments
gamma-Chlordane				4.60E+00	Sample, 1996	Chronic NOAEL in mouse	4.60E+00	Sample, 1996	Chronic NOAEL in mouse	4.60E+00	Sample, 1996	Chronic NOAEL in mouse	2.14E+00	Sample, 1996	Chronic NOAEL in red-winged blackbird	2.14E+00	Sample, 1996	Chronic NOAEL in red-winged blackbird
Indeno(1,2,3-cd)pyrene																		
Lead	1.70E+03	EPA, 2005e	Geometric mean of MATC values for one test species under different pH	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Lithium				1.10E+01	Sample, 1996		7.50E+00	Sample, 1996		1.20E+01	Sample, 1996							
Manganese				1.06E+02	Sample, 1996		7.00E+01	Sample, 1996		1.15E+02	Sample, 1996		9.98E+02	Sample, 1996		1.64E+03	Sample, 1996	
Mercury	2.50E+00	EPA, 1999	Toxicity value not available -- TRV for methyl mercury was used as a surrogate	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)
Molybdenum				2.70E-01	Sample, 1996		1.80E-01	Sample, 1996		2.90E-01	Sample, 1996		1.90E+00	Sample, 1996		3.30E+00	Sample, 1996	
Naphthalene																		
Nickel	2.80E+02	EPA, 2007d	Geometric mean of MATC values for five species under different test conditions	1.70E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.70E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.70E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Phenanthrene																		
Pyrene																		
Vanadium	1.00E+02	EPA, 2005d	LOAEC/NOAEC for growth in brocolli -- used as a surrogate for invertebrates	4.16E+00	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.16E+00	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.16E+00	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	3.44E-01	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	3.44E-01	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Zinc	1.20E+02	EPA, 2007e	Geometric mean of the MATC and EC10 values for three test species under different test species	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups
LPAH	2.90E+01	EPA, 2007b		6.56E+01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.56E+01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.56E+01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival						
HPAH	1.80E+01	EPA, 2007b		6.15E-01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.15E-01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.15E-01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival						
TOTAL PAHs																		

Notes:

EPA, 2007a -- DDT
EPA, 2007b -- PAHs
EPA, 2007c -- Copper
EPA, 2007d -- Nickel
EPA, 2007e -- Zinc
EPA, 2005a -- Antimony
EPA, 2005b -- Cadmium
EPA, 2005c -- Chromium
EPA, 2005d -- Vanadium
EPA, 2005e -- Lead
EPA, 2005f -- Dieldrin
EPA, 2005g -- Barium

TABLE C-4
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL SOUTH OF MARLIN
Invertebrate (EARTHWORM)

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Soil Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table C-3

Chemical	Exposure Point Concentration* Sc	TRV Invertebrate (Earthworm)	Maximum EHQ[+]
2-Methylnaphthalene	7.21E+00		
4,4-DDD	1.12E+00	4.30E-02	2.60E+01
4,4'-DDE	6.93E-02	4.30E-02	1.61E+00
4,4'-DDT	1.13E-01	4.30E-02	2.63E+00
Acenaphthene	1.69E+00		
Acenaphthylene	1.20E+00		
Anthracene	2.46E+00		
Antimony	5.51E+00	3.00E+01	1.84E-01
Aroclor-1254	1.15E+01	2.51E+00	4.58E+00
Arsenic	2.43E+01	6.00E+01	4.05E-01
Barium	2.18E+03	3.30E+02	6.61E+00
Benzo(a)anthracene	5.02E+00		
Benzo(a)pyrene	4.88E+00		
Benzo(b)fluoranthene	5.97E+00		
Benzo(g,h,i)perylene	4.24E+00		
Benzo(k)fluoranthene	4.25E+00		
Boron	5.44E+01		
Cadmium	9.71E+00	1.00E+01	9.71E-01
Chromium	1.36E+02	5.70E+01	2.39E+00
Chrysene	4.87E+00		
Cobalt	1.60E+01		
Copper	4.87E+02	8.00E+01	6.09E+00
Dibenz(a,h)anthracene	1.64E+00		
Dieldrin	2.05E-02		
Endrin Aldehyde	7.38E-02		
Endrin Ketone	2.00E-02		
Fluoranthene	1.42E+01		
Fluorene	1.11E+00		
gamma-Chlordane	1.56E-02		
Indeno(1,2,3-cd)pyrene	6.49E+00		
Lead	7.02E+02	1.70E+03	4.13E-01
Lithium	2.86E+01		
Manganese	8.92E+02		
Mercury	8.50E-01	2.50E+00	3.40E-01
Molybdenum	1.04E+01		
Naphthalene	1.92E+01		
Nickel	3.67E+01	2.80E+02	1.31E-01
Phenanthrene	1.26E+01		
Pyrene	8.47E+00		
Vanadium	4.56E+01	1.00E+02	4.56E-01
Zinc	7.65E+03	1.20E+02	6.38E+01
LPAH	1.82E+01	2.90E+01	6.26E-01
HPAH	5.66E+01	1.80E+01	3.15E+00
TOTAL PAHs	7.48E+01		

Notes:
*EPC for sedentary receptor is maximum measured concentration.
[+]Shading indicates HQ > 1.

TABLE C-5
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	See Table C-1	
IR	Maximum Ingestion rate of soil (kg/day)*	1.50E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.50E+02	Davis and Schmidly, 2009

Chemical	Sc	Intake
2-Methylnaphthalene	1.60E-01	1.60E-09
4,4-DDD	5.08E-02	5.08E-10
4,4'-DDE	2.81E-03	2.81E-11
4,4'-DDT	9.27E-03	9.27E-11
Acenaphthene	1.16E-01	1.16E-09
Acenaphthylene	7.19E-02	7.19E-10
Anthracene	1.24E-01	1.24E-09
Antimony	1.87E+00	1.87E-08
Aroclor-1254	7.73E-01	7.73E-09
Arsenic	4.92E+00	4.92E-08
Barium	3.30E+02	3.30E-06
Benzo(a)anthracene	6.43E-01	6.43E-09
Benzo(a)pyrene	7.63E-01	7.63E-09
Benzo(b)fluoranthene	8.22E-01	8.22E-09
Benzo(g,h,i)perylene	4.94E-01	4.94E-09
Benzo(k)fluoranthene	3.81E-01	3.81E-09
Boron	6.51E+00	6.51E-08
Cadmium	4.67E-01	4.67E-09
Chromium	1.78E+01	1.78E-07
Chrysene	7.12E-01	7.12E-09
Cobalt	4.35E+00	4.35E-08
Copper	4.01E+01	4.01E-07
Dibenz(a,h)anthracene	1.80E-01	1.80E-09
Dieldrin	2.11E-03	2.11E-11
Endrin Aldehyde	3.54E-03	3.54E-11
Endrin Ketone	2.53E-03	2.53E-11
Fluoranthene	1.41E+00	1.41E-08
Fluorene	1.07E-01	1.07E-09
gamma-Chlordane	1.84E-03	1.84E-11
Indeno(1,2,3-cd)pyrene	6.58E-01	6.58E-09
Lead	1.04E+02	1.04E-06
Lithium	1.22E+01	1.22E-07
Manganese	2.78E+02	2.78E-06
Mercury	4.00E-02	4.00E-10
Molybdenum	1.62E+00	1.62E-08
Naphthalene	2.65E-03	2.65E-11
Nickel	1.24E+01	1.24E-07
Phenanthrene	9.99E-01	9.99E-09
Pyrene	9.71E-01	9.71E-09
Vanadium	1.73E+01	1.73E-07
Zinc	8.15E+02	8.15E-06
LPAH	1.58E+00	1.58E-08
HPAH	7.03E+00	7.03E-08
TOTAL PAHs	8.61E+00	8.61E-08

TABLE C-5
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

FOOD INGESTION

INTAKE = ((Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ca	Arthropod concentration (mg/kg)	see Table C-15	
Cp	Plant concentration (mg/kg)	see Table C-15	
IR	Maximum Ingestion rate of of food (kg/day)*	7.49E-05	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	1.00E-01	Prof Judgment
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	9.00E-01	Prof Judgment
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.50E-02	Davis and Schmidly, 2009

Chemical	Arthropod	Plant	Intake
2-Methylnaphthalene	1.12E-02	3.23E-03	2.01E-05
4,4-DDD	6.40E-02	4.76E-04	3.41E-05
4,4'-DDE	3.54E-03	2.63E-05	1.89E-06
4,4'-DDT	1.17E-02	8.69E-05	6.22E-06
Acenaphthene	8.12E-03	2.34E-03	1.46E-05
Acenaphthylene	5.03E-03	1.45E-03	9.04E-06
Anthracene	8.68E-03	2.50E-03	1.56E-05
Antimony	4.11E-01	3.74E-01	1.88E-03
Aroclor-1254	8.73E-01	7.73E-03	4.71E-04
Arsenic	5.41E-01	1.77E-01	1.07E-03
Barium	7.27E+01	4.96E+01	2.59E-01
Benzo(a)anthracene	1.93E-02	1.30E-02	6.80E-05
Benzo(a)pyrene	5.34E-02	7.71E-03	6.13E-05
Benzo(b)fluoranthene	5.75E-02	8.30E-03	6.60E-05
Benzo(g,h,i)perylene	3.46E-02	9.98E-03	6.21E-05
Benzo(k)fluoranthene	3.05E-02	3.85E-03	3.25E-05
Boron	6.51E+00	6.51E+00	3.25E-02
Cadmium	4.48E-01	1.70E-01	9.88E-04
Chromium	1.78E-01	1.33E-01	6.87E-04
Chrysene	2.85E-02	1.33E-02	7.41E-05
Cobalt	4.35E+00	3.24E-02	2.32E-03
Copper	1.60E+00	1.60E+01	7.28E-02
Dibenz(a,h)anthracene	1.26E-02	1.15E-03	1.15E-05
Dieldrin	3.10E-02	7.36E-05	1.58E-05
Endrin Aldehyde	3.54E-03	2.04E-04	2.68E-06
Endrin Ketone	2.53E-03	1.46E-04	1.92E-06
Fluoranthene	9.86E-02	2.84E-02	1.77E-04
Fluorene	7.49E-03	2.16E-03	1.35E-05
gamma-Chlordane	1.84E-03	2.63E-05	1.04E-06
Indeno(1,2,3-cd)pyrene	5.26E-02	2.57E-03	3.78E-05
Lead	3.12E+00	4.68E+00	2.26E-02
Lithium	1.22E+01	1.22E+01	6.08E-02
Manganese	1.68E+01	2.20E+01	1.07E-01
Mercury	3.40E-01	5.48E-03	1.94E-04
Molybdenum	1.62E-02	1.22E-02	6.28E-05
Naphthalene	1.86E-04	5.35E-05	3.33E-07
Nickel	2.47E-01	3.96E-01	1.90E-03
Phenanthrene	6.99E-02	2.02E-02	1.26E-04
Pyrene	6.80E-02	1.96E-02	1.22E-04
Vanadium	1.73E-01	1.30E-01	6.68E-04
Zinc	4.57E+02	9.78E-10	2.28E-01
LPAH	1.11E-01	3.19E-02	1.99E-04
HPAH	4.92E-01	1.42E-01	8.84E-04
TOTAL PAHs	6.03E-01	1.72E-01	1.08E-03

TABLE C-5
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	2.01E-05
4,4-DDD	3.41E-05
4,4'-DDE	1.89E-06
4,4'-DDT	6.22E-06
Acenaphthene	1.46E-05
Acenaphthylene	9.04E-06
Anthracene	1.56E-05
Antimony	1.88E-03
Aroclor-1254	4.71E-04
Arsenic	1.07E-03
Barium	2.59E-01
Benzo(a)anthracene	6.80E-05
Benzo(a)pyrene	6.13E-05
Benzo(b)fluoranthene	6.60E-05
Benzo(g,h,i)perylene	6.21E-05
Benzo(k)fluoranthene	3.25E-05
Boron	3.25E-02
Cadmium	9.88E-04
Chromium	6.87E-04
Chrysene	7.41E-05
Cobalt	2.32E-03
Copper	7.28E-02
Dibenz(a,h)anthracene	1.15E-05
Dieldrin	1.58E-05
Endrin Aldehyde	2.68E-06
Endrin Ketone	1.92E-06
Fluoranthene	1.77E-04
Fluorene	1.35E-05
gamma-Chlordane	1.04E-06
Indeno(1,2,3-cd)pyrene	3.78E-05
Lead	2.26E-02
Lithium	6.08E-02
Manganese	1.07E-01
Mercury	1.94E-04
Molybdenum	6.28E-05
Naphthalene	3.33E-07
Nickel	1.90E-03
Phenanthrene	1.26E-04
Pyrene	1.22E-04
Vanadium	6.68E-04
Zinc	2.28E-01
LPAH	1.99E-04
HPAH	8.84E-04
TOTAL PAHs	1.08E-03

Notes:
* Expressed in dry weight.

TABLE C-6
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table C-1	
IR	Maximum Ingestion rate of soil (kg/day)*	4.83E-05	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.40E+01	avis and Schmidly, 2009

Chemical	Sc	Intake
2-Methylnaphthalene	1.60E-01	5.52E-07
4,4-DDD	5.08E-02	1.75E-07
4,4'-DDE	2.81E-03	9.69E-09
4,4'-DDT	9.27E-03	3.20E-08
Acenaphthene	1.16E-01	4.00E-07
Acenaphthylene	7.19E-02	2.48E-07
Anthracene	1.24E-01	4.28E-07
Antimony	1.87E+00	6.44E-06
Aroclor-1254	7.73E-01	2.67E-06
Arsenic	4.92E+00	1.70E-05
Barium	3.30E+02	1.14E-03
Benzo(a)anthracene	6.43E-01	2.22E-06
Benzo(a)pyrene	7.63E-01	2.63E-06
Benzo(b)fluoranthene	8.22E-01	2.84E-06
Benzo(g,h,i)perylene	4.94E-01	1.70E-06
Benzo(k)fluoranthene	3.81E-01	1.31E-06
Boron	6.51E+00	2.24E-05
Cadmium	4.67E-01	1.61E-06
Chromium	1.78E+01	6.12E-05
Chrysene	7.12E-01	2.46E-06
Cobalt	4.35E+00	1.50E-05
Copper	4.01E+01	1.38E-04
Dibenz(a,h)anthracene	1.80E-01	6.21E-07
Dieldrin	2.11E-03	7.28E-09
Endrin Aldehyde	3.54E-03	1.22E-08
Endrin Ketone	2.53E-03	8.73E-09
Fluoranthene	1.41E+00	4.86E-06
Fluorene	1.07E-01	3.69E-07
gamma-Chlordane	1.84E-03	6.35E-09
Indeno(1,2,3-cd)pyrene	6.58E-01	2.27E-06
Lead	1.04E+02	3.59E-04
Lithium	1.22E+01	4.20E-05
Manganese	2.78E+02	9.58E-04
Mercury	4.00E-02	1.38E-07
Molybdenum	1.62E+00	5.60E-06
Naphthalene	2.65E-03	9.14E-09
Nickel	1.24E+01	4.27E-05
Phenanthrene	9.99E-01	3.45E-06
Pyrene	9.71E-01	3.35E-06
Vanadium	1.73E+01	5.96E-05
Zinc	8.15E+02	2.81E-03
LPAH	1.58E+00	5.45E-06
HPAH	7.03E+00	2.43E-05
TOTAL PAHs	8.61E+00	2.97E-05

TABLE C-6
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

FOOD INGESTION

INTAKE = ((Cm * IR * Dfm * AUF)/(BW) + (Cb * IR * DFb * AUF) / (BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cm	Mammal concentration (mg/kg)	see Table C-15	
Cb	Bird concentration (mg/kg)	see Table C-15	
IR	Maximum Ingestion rate of of food (kg/day)*	2.41E-03	EPA, 1993
Dfm	Dietary fraction of small mammals (unitless)	7.50E-01	EPA, 1993
Dfb	Dietary fraction of birds (unitless)	2.50E-01	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.40E+01	EPA, 1993

Chemical	Mammal	Bird	Intake
2-Methylnaphthalene	1.92E-04	2.60E-04	3.60E-08
4,4-DDD	1.63E-05	3.35E-05	3.54E-09
4,4'-DDE	8.99E-07	1.85E-06	1.96E-10
4,4'-DDT	2.97E-06	6.11E-06	6.46E-10
Acenaphthene	1.39E-04	1.89E-04	2.61E-08
Acenaphthylene	8.63E-05	1.17E-04	1.62E-08
Anthracene	1.49E-04	2.02E-04	2.79E-08
Antimony	2.26E-04	2.26E-04	3.90E-08
Aroclor-1254	2.33E-04	4.61E-04	4.99E-08
Arsenic	2.27E-04	2.27E-04	3.90E-08
Barium	4.53E-03	4.53E-03	7.79E-07
Benzo(a)anthracene	1.05E-04	1.41E-04	1.96E-08
Benzo(a)pyrene	1.94E-04	3.82E-04	4.14E-08
Benzo(b)fluoranthene	2.47E-04	4.86E-04	5.27E-08
Benzo(g,h,i)perylene	5.93E-04	8.03E-04	1.11E-07
Benzo(k)fluoranthene	1.14E-04	2.24E-04	2.43E-08
Boron	1.30E+01	1.30E+01	2.24E-03
Cadmium	1.23E-05	8.71E-03	3.76E-07
Chromium	5.80E-04	5.80E-04	9.98E-08
Chrysene	1.24E-04	1.75E-04	2.36E-08
Cobalt	4.68E-01	4.68E-01	8.05E-05
Copper	1.81E+01	1.81E+01	3.12E-03
Dibenz(a,h)anthracene	8.40E-05	2.15E-04	2.01E-08
Dieldrin	2.11E-03	2.11E-03	3.63E-07
Endrin Aldehyde	3.54E-03	3.54E-03	6.09E-07
Endrin Ketone	2.53E-03	2.53E-03	4.36E-07
Fluoranthene	1.69E-03	2.29E-03	3.17E-07
Fluorene	1.28E-04	1.74E-04	2.41E-08
gamma-Chlordane	1.84E-03	1.84E-03	3.17E-07
Indeno(1,2,3-cd)pyrene	5.14E-04	1.71E-03	1.40E-07
Lead	8.87E-04	8.87E-04	1.53E-07
Lithium	2.43E+01	2.43E+01	4.19E-03
Manganese	3.00E+02	3.00E+02	5.16E-02
Mercury	2.61E-06	1.08E-05	8.00E-10
Molybdenum	5.30E-05	5.30E-05	9.12E-09
Naphthalene	3.18E-06	4.31E-06	5.96E-10
Nickel	1.53E-03	1.53E-03	2.64E-07
Phenanthrene	1.20E-03	1.62E-03	2.25E-07
Pyrene	1.16E-03	1.58E-03	2.18E-07
Vanadium	5.64E-04	5.64E-04	9.71E-08
Zinc	1.05E-04	1.02E-01	4.40E-06
LPAH	1.90E-03	2.57E-03	3.55E-07
HPAH	8.44E-03	1.14E-02	1.58E-06
TOTAL PAHs	1.02E-02	1.40E-02	1.92E-06

TABLE C-6
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	5.88E-07
4,4-DDD	1.79E-07
4,4'-DDE	9.89E-09
4,4'-DDT	3.26E-08
Acenaphthene	4.26E-07
Acenaphthylene	2.64E-07
Anthracene	4.56E-07
Antimony	6.48E-06
Aroclor-1254	2.72E-06
Arsenic	1.70E-05
Barium	1.14E-03
Benzo(a)anthracene	2.24E-06
Benzo(a)pyrene	2.67E-06
Benzo(b)fluoranthene	2.89E-06
Benzo(g,h,i)perylene	1.82E-06
Benzo(k)fluoranthene	1.34E-06
Boron	2.26E-03
Cadmium	1.99E-06
Chromium	6.13E-05
Chrysene	2.48E-06
Cobalt	9.55E-05
Copper	3.26E-03
Dibenz(a,h)anthracene	6.41E-07
Dieldrin	3.71E-07
Endrin Aldehyde	6.22E-07
Endrin Ketone	4.44E-07
Fluoranthene	5.17E-06
Fluorene	3.93E-07
gamma-Chlordane	3.23E-07
Indeno(1,2,3-cd)pyrene	2.41E-06
Lead	3.59E-04
Lithium	4.23E-03
Manganese	5.26E-02
Mercury	1.39E-07
Molybdenum	5.61E-06
Naphthalene	9.74E-09
Nickel	4.29E-05
Phenanthrene	3.67E-06
Pyrene	3.57E-06
Vanadium	5.97E-05
Zinc	2.82E-03
LPAH	5.81E-06
HPAH	2.58E-05
TOTAL PAHs	3.16E-05

Notes:
* Expressed in dry weight.

TABLE C-7
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table C-1	
IR	Maximum Ingestion rate of soil (kg/day)*	2.71E-07	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	4.00E-03	Davis and Schmidly, 2009

Chemical	Sc	Intake
2-Methylnaphthalene	1.60E-01	1.08E-05
4,4-DDD	5.08E-02	3.44E-06
4,4'-DDE	2.81E-03	1.90E-07
4,4'-DDT	9.27E-03	6.28E-07
Acenaphthene	1.16E-01	7.86E-06
Acenaphthylene	7.19E-02	4.87E-06
Anthracene	1.24E-01	8.40E-06
Antimony	1.87E+00	1.27E-04
Aroclor-1254	7.73E-01	5.24E-05
Arsenic	4.92E+00	3.33E-04
Barium	3.30E+02	2.24E-02
Benzo(a)anthracene	6.43E-01	4.36E-05
Benzo(a)pyrene	7.63E-01	5.17E-05
Benzo(b)fluoranthene	8.22E-01	5.57E-05
Benzo(g,h,i)perylene	4.94E-01	3.35E-05
Benzo(k)fluoranthene	3.81E-01	2.58E-05
Boron	6.51E+00	4.41E-04
Cadmium	4.67E-01	3.16E-05
Chromium	1.78E+01	1.20E-03
Chrysene	7.12E-01	4.82E-05
Cobalt	4.35E+00	2.95E-04
Copper	4.01E+01	2.72E-03
Dibenz(a,h)anthracene	1.80E-01	1.22E-05
Dieldrin	2.11E-03	1.43E-07
Endrin Aldehyde	3.54E-03	2.40E-07
Endrin Ketone	2.53E-03	1.71E-07
Fluoranthene	1.41E+00	9.54E-05
Fluorene	1.07E-01	7.25E-06
gamma-Chlordane	1.84E-03	1.25E-07
Indeno(1,2,3-cd)pyrene	6.58E-01	4.46E-05
Lead	1.04E+02	7.05E-03
Lithium	1.22E+01	8.25E-04
Manganese	2.78E+02	1.88E-02
Mercury	4.00E-02	2.71E-06
Molybdenum	1.62E+00	1.10E-04
Naphthalene	2.65E-03	1.80E-07
Nickel	1.24E+01	8.38E-04
Phenanthrene	9.99E-01	6.77E-05
Pyrene	9.71E-01	6.58E-05
Vanadium	1.73E+01	1.17E-03
Zinc	8.15E+02	5.52E-02
LPAH	1.58E+00	1.07E-04
HPAH	7.03E+00	4.76E-04
TOTAL PAHs	8.61E+00	5.84E-04

TABLE C-7
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

FOOD INGESTION

INTAKE = ((Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ca	Arthropod concentration (mg/kg)	see Table C-15	
Cp	Plant concentration (mg/kg)	see Table C-15	
IR	Maximum Ingestion rate of of food (kg/day)*	3.38E-06	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	9.00E-01	EPA, 1993
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	1.00E-01	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	4.00E-03	Davis and Schmidly, 2009

Chemical	Arthropod	Plant	Intake
2-Methylnaphthalene	1.12E-02	3.23E-03	8.79E-06
4,4-DDD	6.40E-02	4.76E-04	4.87E-05
4,4'-DDE	3.54E-03	2.63E-05	2.69E-06
4,4'-DDT	1.17E-02	8.69E-05	8.89E-06
Acenaphthene	8.12E-03	2.34E-03	6.37E-06
Acenaphthylene	5.03E-03	1.45E-03	3.95E-06
Anthracene	8.68E-03	2.50E-03	6.81E-06
Antimony	4.11E-01	3.74E-01	3.44E-04
Aroclor-1254	8.73E-01	7.73E-03	6.65E-04
Arsenic	5.41E-01	1.77E-01	4.26E-04
Barium	7.27E+01	4.96E+01	5.95E-02
Benzo(a)anthracene	1.93E-02	1.30E-02	1.58E-05
Benzo(a)pyrene	5.34E-02	7.71E-03	4.13E-05
Benzo(b)fluoranthene	5.75E-02	8.30E-03	4.45E-05
Benzo(g,h,i)perylene	3.46E-02	9.98E-03	2.71E-05
Benzo(k)fluoranthene	3.05E-02	3.85E-03	2.35E-05
Boron	6.51E+00	6.51E+00	5.50E-03
Cadmium	4.48E-01	1.70E-01	3.55E-04
Chromium	1.78E-01	1.33E-01	1.46E-04
Chrysene	2.85E-02	1.33E-02	2.28E-05
Cobalt	4.35E+00	3.24E-02	3.31E-03
Copper	1.60E+00	1.60E+01	2.57E-03
Dibenz(a,h)anthracene	1.26E-02	1.15E-03	9.68E-06
Dieldrin	3.10E-02	7.36E-05	2.36E-05
Endrin Aldehyde	3.54E-03	2.04E-04	2.71E-06
Endrin Ketone	2.53E-03	1.46E-04	1.94E-06
Fluoranthene	9.86E-02	2.84E-02	7.74E-05
Fluorene	7.49E-03	2.16E-03	5.88E-06
gamma-Chlordane	1.84E-03	2.63E-05	1.40E-06
Indeno(1,2,3-cd)pyrene	5.26E-02	2.57E-03	4.02E-05
Lead	3.12E+00	4.68E+00	2.77E-03
Lithium	1.22E+01	1.22E+01	1.03E-02
Manganese	1.68E+01	2.20E+01	1.46E-02
Mercury	3.40E-01	5.48E-03	2.59E-04
Molybdenum	1.62E-02	1.22E-02	1.34E-05
Naphthalene	1.86E-04	5.35E-05	1.46E-07
Nickel	2.47E-01	3.96E-01	2.22E-04
Phenanthrene	6.99E-02	2.02E-02	5.49E-05
Pyrene	6.80E-02	1.96E-02	5.33E-05
Vanadium	1.73E-01	1.30E-01	1.42E-04
Zinc	4.57E+02	9.78E-10	3.47E-01
LPAH	1.11E-01	3.19E-02	8.68E-05
HPAH	4.92E-01	1.42E-01	3.86E-04
TOTAL PAHs	6.03E-01	1.72E-01	4.73E-04

TABLE C-7
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.96E-05
4,4-DDD	5.22E-05
4,4'-DDE	2.89E-06
4,4'-DDT	9.52E-06
Acenaphthene	1.42E-05
Acenaphthylene	8.82E-06
Anthracene	1.52E-05
Antimony	4.71E-04
Aroclor-1254	7.17E-04
Arsenic	7.59E-04
Barium	8.19E-02
Benzo(a)anthracene	5.93E-05
Benzo(a)pyrene	9.30E-05
Benzo(b)fluoranthene	1.00E-04
Benzo(g,h,i)perylene	6.06E-05
Benzo(k)fluoranthene	4.93E-05
Boron	5.94E-03
Cadmium	3.87E-04
Chromium	1.35E-03
Chrysene	7.10E-05
Cobalt	3.61E-03
Copper	5.29E-03
Dibenz(a,h)anthracene	2.19E-05
Dieldrin	2.37E-05
Endrin Aldehyde	2.95E-06
Endrin Ketone	2.11E-06
Fluoranthene	1.73E-04
Fluorene	1.31E-05
gamma-Chlordane	1.53E-06
Indeno(1,2,3-cd)pyrene	8.48E-05
Lead	9.81E-03
Lithium	1.11E-02
Manganese	3.35E-02
Mercury	2.62E-04
Molybdenum	1.23E-04
Naphthalene	3.25E-07
Nickel	1.06E-03
Phenanthrene	1.23E-04
Pyrene	1.19E-04
Vanadium	1.31E-03
Zinc	4.02E-01
LPAH	1.94E-04
HPAH	8.63E-04
TOTAL PAHs	1.06E-03

Notes:
Soil ingestion was assumed to be 8% of dietary intake.

TABLE C-8
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Avian Omnivore/Herbivore (AMERICAN ROBIN)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table C-2	
IR	Maximum Ingestion rate of soil (kg/day)*	2.52E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	6.30E-02	EPA, 1993

Chemical		Sc	Intake
2-Methylnaphthalene		7.90E-02	3.16E-06
4,4-DDD		2.70E-04	1.08E-08
4,4'-DDE		7.52E-03	3.01E-07
4,4'-DDT		1.03E-02	4.12E-07
Acenaphthene		2.00E-01	8.00E-06
Acenaphthylene		1.21E-01	4.84E-06
Anthracene		2.99E-01	1.20E-05
Antimony		2.24E+00	8.97E-05
Aroclor-1254		7.64E-01	3.06E-05
Arsenic		6.49E+00	2.60E-04
Barium		5.84E+02	2.34E-02
Benzo(a)anthracene		9.03E-01	3.61E-05
Benzo(a)pyrene		1.09E+00	4.34E-05
Benzo(b)fluoranthene		1.10E+00	4.41E-05
Benzo(g,h,i)perylene		7.89E-01	3.16E-05
Benzo(k)fluoranthene		6.58E-01	2.63E-05
Boron		7.07E+00	2.83E-04
Cadmium		1.25E+00	5.01E-05
Chromium		2.68E+01	1.07E-03
Chrysene		9.84E-01	3.94E-05
Cobalt		5.25E+00	2.10E-04
Copper		5.22E+01	2.09E-03
Dibenz(a,h)anthracene		2.45E-01	9.80E-06
Dieldrin		3.14E-03	1.26E-07
Endrin Aldehyde		8.72E-03	3.49E-07
Endrin Ketone		4.41E-03	1.76E-07
Fluoranthene		2.14E+00	8.54E-05
Fluorene		1.57E-01	6.28E-06
gamma-Chlordane		2.90E-03	1.16E-07
Indeno(1,2,3-cd)pyrene		9.31E-01	3.72E-05
Lead		1.47E+02	5.88E-03
Lithium		1.18E+01	4.71E-04
Manganese		2.81E+02	1.12E-02
Mercury		7.42E-02	2.97E-06
Molybdenum		2.40E+00	9.60E-05
Naphthalene	all soil data (not a COPEC in surface soil)	2.65E-03	1.06E-07
Nickel		1.50E+01	6.01E-04
Phenanthrene		1.06E+04	4.23E-01
Pyrene		1.36E+00	5.45E-05
Vanadium		1.80E+01	7.22E-04
Zinc		1.06E+03	4.25E-02
LPAH		1.06E+04	4.23E-01
HPAH		1.02E+01	4.08E-04
TOTAL PAHs		1.06E+04	4.23E-01

TABLE C-8
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Avian Omnivore/Herbivore (AMERICAN ROBIN)

FOOD INGESTION

INTAKE = ((Ce * IR * Dfe * AUF)/(BW) + (Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ce	Earthworm concentration (mg/kg)	see Table C-15	
Ca	Arthropod concentration (mg/kg)	see Table C-15	
Cp	Plant concentration (mg/kg)	see Table C-15	
IR	Maximum Ingestion rate of of food (kg/day)*	4.85E-05	EPA, 1993
Dfe	Dietary fraction of earthworms (unitless)	4.60E-01	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	4.60E-01	EPA, 1993
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	8.00E-02	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	6.30E-02	EPA, 1993

Chemical	Earthworm	Arthropod	Plant	Intake
2-Methylnaphthalene	1.12E-02	1.12E-02	3.23E-03	8.13E-06
4,4-DDD	6.40E-02	6.40E-02	4.76E-04	4.54E-05
4,4'-DDE	3.54E-03	3.54E-03	2.63E-05	2.51E-06
4,4'-DDT	1.17E-02	1.17E-02	8.69E-05	8.28E-06
Acenaphthene	8.12E-03	8.12E-03	2.34E-03	5.90E-06
Acenaphthylene	5.03E-03	5.03E-03	1.45E-03	3.65E-06
Anthracene	8.68E-03	8.68E-03	2.50E-03	6.30E-06
Antimony	4.11E-01	4.11E-01	3.74E-01	3.14E-04
Aroclor-1254	8.73E-01	8.73E-01	7.73E-03	6.19E-04
Arsenic	5.41E-01	5.41E-01	1.77E-01	3.94E-04
Barium	7.27E+01	7.27E+01	4.96E+01	5.45E-02
Benzo(a)anthracene	1.93E-02	1.93E-02	1.30E-02	1.45E-05
Benzo(a)pyrene	5.34E-02	5.34E-02	7.71E-03	3.83E-05
Benzo(b)fluoranthene	5.75E-02	5.75E-02	8.30E-03	4.13E-05
Benzo(g,h,i)perylene	3.46E-02	3.46E-02	9.98E-03	2.51E-05
Benzo(k)fluoranthene	3.05E-02	3.05E-02	3.85E-03	2.18E-05
Boron	6.51E+00	6.51E+00	6.51E+00	5.01E-03
Cadmium	4.48E-01	4.48E-01	1.70E-01	3.28E-04
Chromium	1.78E-01	1.78E-01	1.33E-01	1.34E-04
Chrysene	2.85E-02	2.85E-02	1.33E-02	2.10E-05
Cobalt	4.35E+00	4.35E+00	3.24E-02	3.08E-03
Copper	1.60E+00	1.60E+00	1.60E+01	2.12E-03
Dibenz(a,h)anthracene	1.26E-02	1.26E-02	1.15E-03	8.99E-06
Dieldrin	3.10E-02	3.10E-02	7.36E-05	2.20E-05
Endrin Aldehyde	3.54E-03	3.54E-03	2.04E-04	2.52E-06
Endrin Ketone	2.53E-03	2.53E-03	1.46E-04	1.80E-06
Fluoranthene	9.86E-02	9.86E-02	2.84E-02	7.16E-05
Fluorene	7.49E-03	7.49E-03	2.16E-03	5.44E-06
gamma-Chlordane	1.84E-03	1.84E-03	2.63E-05	1.30E-06
Indeno(1,2,3-cd)pyrene	5.26E-02	5.26E-02	2.57E-03	3.74E-05
Lead	3.12E+00	3.12E+00	4.68E+00	2.50E-03
Lithium	1.22E+01	1.22E+01	1.22E+01	9.37E-03
Manganese	1.68E+01	1.68E+01	2.20E+01	1.33E-02
Mercury	3.40E-01	3.40E-01	5.48E-03	2.41E-04
Molybdenum	1.62E-02	1.62E-02	1.22E-02	1.22E-05
Naphthalene	1.86E-04	1.86E-04	5.35E-05	1.35E-07
Nickel	2.47E-01	2.47E-01	3.96E-01	2.00E-04
Phenanthrene	6.99E-02	6.99E-02	2.02E-02	5.08E-05
Pyrene	6.80E-02	6.80E-02	1.96E-02	4.93E-05
Vanadium	1.73E-01	1.73E-01	1.30E-01	1.30E-04
Zinc	4.57E+02	4.57E+02	9.78E-10	3.23E-01
LPAH	1.11E-01	1.11E-01	3.19E-02	8.03E-05
HPAH	4.92E-01	4.92E-01	1.42E-01	3.57E-04
TOTAL PAHs	6.03E-01	6.03E-01	1.72E-01	4.38E-04

TABLE C-8
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Avian Omnivore/Herbivore (AMERICAN ROBIN)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.13E-05
4,4-DDD	4.54E-05
4,4'-DDE	2.81E-06
4,4'-DDT	8.69E-06
Acenaphthene	1.39E-05
Acenaphthylene	8.49E-06
Anthracene	1.83E-05
Antimony	4.04E-04
Aroclor-1254	6.50E-04
Arsenic	6.54E-04
Barium	7.79E-02
Benzo(a)anthracene	5.06E-05
Benzo(a)pyrene	8.17E-05
Benzo(b)fluoranthene	8.53E-05
Benzo(g,h,i)perylene	5.67E-05
Benzo(k)fluoranthene	4.81E-05
Boron	5.29E-03
Cadmium	3.78E-04
Chromium	1.21E-03
Chrysene	6.04E-05
Cobalt	3.29E-03
Copper	4.21E-03
Dibenz(a,h)anthracene	1.88E-05
Dieldrin	2.21E-05
Endrin Aldehyde	2.87E-06
Endrin Ketone	1.98E-06
Fluoranthene	1.57E-04
Fluorene	1.17E-05
gamma-Chlordane	1.42E-06
Indeno(1,2,3-cd)pyrene	7.47E-05
Lead	8.37E-03
Lithium	9.84E-03
Manganese	2.45E-02
Mercury	2.44E-04
Molybdenum	1.08E-04
Naphthalene	2.41E-07
Nickel	8.00E-04
Phenanthrene	4.23E-01
Pyrene	1.04E-04
Vanadium	8.52E-04
Zinc	3.66E-01
LPAH	4.23E-01
HPAH	7.65E-04
TOTAL PAHs	4.24E-01

TABLE C-9
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table C-2	
IR	Maximum Ingestion rate of soil (kg/day)*	8.97E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	9.57E-01	EPA, 1993

Chemical		Sc	Intake
2-Methylnaphthalene		7.90E-02	7.40E-07
4,4-DDD		2.70E-04	2.53E-09
4,4'-DDE		7.52E-03	7.05E-08
4,4'-DDT		1.03E-02	9.65E-08
Acenaphthene		2.00E-01	1.87E-06
Acenaphthylene		1.21E-01	1.13E-06
Anthracene		2.99E-01	2.80E-06
Antimony		2.24E+00	2.10E-05
Aroclor-1254		7.64E-01	7.16E-06
Arsenic		6.49E+00	6.08E-05
Barium		5.84E+02	5.48E-03
Benzo(a)anthracene		9.03E-01	8.46E-06
Benzo(a)pyrene		1.09E+00	1.02E-05
Benzo(b)fluoranthene		1.10E+00	1.03E-05
Benzo(g,h,i)perylene		7.89E-01	7.40E-06
Benzo(k)fluoranthene		6.58E-01	6.17E-06
Boron		7.07E+00	6.63E-05
Cadmium		1.25E+00	1.17E-05
Chromium		2.68E+01	2.52E-04
Chrysene		9.84E-01	9.22E-06
Cobalt		5.25E+00	4.92E-05
Copper		5.22E+01	4.89E-04
Dibenz(a,h)anthracene		2.45E-01	2.30E-06
Dieldrin		3.14E-03	2.94E-08
Endrin Aldehyde		8.72E-03	8.17E-08
Endrin Ketone		4.41E-03	4.13E-08
Fluoranthene		2.14E+00	2.00E-05
Fluorene		1.57E-01	1.47E-06
gamma-Chlordane		2.90E-03	2.72E-08
Indeno(1,2,3-cd)pyrene		9.31E-01	8.73E-06
Lead		1.47E+02	1.38E-03
Lithium		1.18E+01	1.10E-04
Manganese		2.81E+02	2.63E-03
Mercury		7.42E-02	6.95E-07
Molybdenum		2.40E+00	2.25E-05
Naphthalene	all soil data (not a COPEC in surface soil)	2.65E-03	2.48E-08
Nickel		1.50E+01	1.41E-04
Phenanthrene		1.06E+04	9.91E-02
Pyrene		1.36E+00	1.28E-05
Vanadium		1.80E+01	1.69E-04
Zinc		1.06E+03	9.95E-03
LPAH		1.58E+00	1.48E-05
HPAH		7.03E+00	6.59E-05
TOTAL PAHs		8.61E+00	8.07E-05

TABLE C-9
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

FOOD INGESTION

INTAKE = ((Cm * IR * Dfm * AUF)/(BW) + (Cb * IR * DFb * AUF) / (BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cm	Mammal concentration (mg/kg)	see Table C-15	
Cb	Bird concentration (mg/kg)	see Table C-15	
IR	Maximum Ingestion rate of of food (kg/day)*	4.48E-04	EPA, 1993
Dfm	Dietary fraction of small mammals (unitless)	7.85E-01	EPA, 1993
Dfb	Dietary fraction of birds (unitless)	2.15E-01	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	9.57E-01	EPA, 1993

Chemical	Mammal	Bird	Intake
2-Methylnaphthalene	1.92E-04	2.60E-04	9.67E-08
4,4-DDD	1.63E-05	3.35E-05	9.34E-09
4,4'-DDE	8.99E-07	1.85E-06	5.17E-10
4,4'-DDT	2.97E-06	6.11E-06	1.71E-09
Acenaphthene	1.39E-04	1.89E-04	7.01E-08
Acenaphthylene	8.63E-05	1.17E-04	4.35E-08
Anthracene	1.49E-04	2.02E-04	7.50E-08
Antimony	2.26E-04	2.26E-04	1.06E-07
Aroclor-1254	2.33E-04	4.61E-04	1.32E-07
Arsenic	2.27E-04	2.27E-04	1.06E-07
Barium	4.53E-03	4.53E-03	2.12E-06
Benzo(a)anthracene	1.05E-04	1.41E-04	5.26E-08
Benzo(a)pyrene	1.94E-04	3.82E-04	1.10E-07
Benzo(b)fluoranthene	2.47E-04	4.86E-04	1.40E-07
Benzo(g,h,i)perylene	5.93E-04	8.03E-04	2.99E-07
Benzo(k)fluoranthene	1.14E-04	2.24E-04	6.44E-08
Boron	1.30E+01	1.30E+01	6.09E-03
Cadmium	1.23E-05	8.71E-03	8.81E-07
Chromium	5.80E-04	5.80E-04	2.71E-07
Chrysene	1.24E-04	1.75E-04	6.33E-08
Cobalt	4.68E-01	4.68E-01	2.19E-04
Copper	1.81E+01	1.81E+01	8.49E-03
Dibenz(a,h)anthracene	8.40E-05	2.15E-04	5.26E-08
Dieldrin	2.11E-03	2.11E-03	9.88E-07
Endrin Aldehyde	3.54E-03	3.54E-03	1.66E-06
Endrin Ketone	2.53E-03	2.53E-03	1.18E-06
Fluoranthene	1.69E-03	2.29E-03	8.51E-07
Fluorene	1.28E-04	1.74E-04	6.47E-08
gamma-Chlordane	1.84E-03	1.84E-03	8.62E-07
Indeno(1,2,3-cd)pyrene	5.14E-04	1.71E-03	3.61E-07
Lead	8.87E-04	8.87E-04	4.15E-07
Lithium	2.43E+01	2.43E+01	1.14E-02
Manganese	3.00E+02	3.00E+02	1.40E-01
Mercury	2.61E-06	1.08E-05	2.04E-09
Molybdenum	5.30E-05	5.30E-05	2.48E-08
Naphthalene	3.18E-06	4.31E-06	1.60E-09
Nickel	1.53E-03	1.53E-03	7.17E-07
Phenanthrene	1.20E-03	1.62E-03	6.04E-07
Pyrene	1.16E-03	1.58E-03	5.87E-07
Vanadium	5.64E-04	5.64E-04	2.64E-07
Zinc	1.05E-04	1.02E-01	1.03E-05
LPAH	1.90E-03	2.57E-03	9.55E-07
HPAH	8.44E-03	1.14E-02	4.25E-06
TOTAL PAHs	1.02E-02	1.40E-02	5.17E-06

TABLE C-9
INTAKE CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	8.37E-07
4,4-DDD	1.19E-08
4,4'-DDE	7.10E-08
4,4'-DDT	9.82E-08
Acenaphthene	1.94E-06
Acenaphthylene	1.18E-06
Anthracene	2.88E-06
Antimony	2.11E-05
Aroclor-1254	7.29E-06
Arsenic	6.09E-05
Barium	5.48E-03
Benzo(a)anthracene	8.52E-06
Benzo(a)pyrene	1.03E-05
Benzo(b)fluoranthene	1.05E-05
Benzo(g,h,i)perylene	7.69E-06
Benzo(k)fluoranthene	6.23E-06
Boron	6.16E-03
Cadmium	1.26E-05
Chromium	2.52E-04
Chrysene	9.29E-06
Cobalt	2.68E-04
Copper	8.98E-03
Dibenz(a,h)anthracene	2.35E-06
Dieldrin	1.02E-06
Endrin Aldehyde	1.74E-06
Endrin Ketone	1.23E-06
Fluoranthene	2.09E-05
Fluorene	1.54E-06
gamma-Chlordane	8.89E-07
Indeno(1,2,3-cd)pyrene	9.09E-06
Lead	1.38E-03
Lithium	1.15E-02
Manganese	1.43E-01
Mercury	6.98E-07
Molybdenum	2.25E-05
Naphthalene	2.64E-08
Nickel	1.42E-04
Phenanthrene	9.91E-02
Pyrene	1.34E-05
Vanadium	1.69E-04
Zinc	9.96E-03
LPAH	1.58E-05
HPAH	7.02E-05
TOTAL PAHs	8.59E-05

Notes:
* Expressed in dry weight.

TABLE C-10
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table C-3

Chemical	Intake	TRV (deer mouse)	EHQ
2-Methylnaphthalene	2.01E-05		
4,4-DDD	3.41E-05	1.47E-01	2.32E-04
4,4'-DDE	1.89E-06	1.47E-01	1.28E-05
4,4'-DDT	6.22E-06	1.47E-01	4.23E-05
Acenaphthene	1.46E-05		
Acenaphthylene	9.04E-06		
Anthracene	1.56E-05		
Antimony	1.88E-03	1.25E-01	1.51E-02
Aroclor-1254	4.71E-04	1.55E-01	3.04E-03
Arsenic	1.07E-03	1.85E+00	5.76E-04
Barium	2.59E-01	5.18E+01	5.00E-03
Benzo(a)anthracene	6.80E-05		
Benzo(a)pyrene	6.13E-05		
Benzo(b)fluoranthene	6.60E-05		
Benzo(g,h,i)perylene	6.21E-05		
Benzo(k)fluoranthene	3.25E-05		
Boron	3.25E-02	3.40E+01	9.55E-04
Cadmium	9.88E-04	7.70E-01	1.28E-03
Chromium	6.87E-04	2.40E+00	2.86E-04
Chrysene	7.41E-05		
Cobalt	2.32E-03		
Copper	7.28E-02	5.60E+00	1.30E-02
Dibenz(a,h)anthracene	1.15E-05		
Dieldrin	1.58E-05	1.50E-02	1.05E-03
Endrin Aldehyde	2.68E-06	9.20E-02	2.92E-05
Endrin Ketone	1.92E-06	9.20E-02	2.09E-05
Fluoranthene	1.77E-04		
Fluorene	1.35E-05		
gamma-Chlordane	1.04E-06	4.60E+00	2.25E-07
Indeno(1,2,3-cd)pyrene	3.78E-05		
Lead	2.26E-02	4.70E+00	4.81E-03
Lithium	6.08E-02	1.10E+01	5.52E-03
Manganese	1.07E-01	1.06E+02	1.01E-03
Mercury	1.94E-04	1.01E+00	1.92E-04
Molybdenum	6.28E-05	2.70E-01	2.33E-04
Naphthalene	3.33E-07		
Nickel	1.90E-03	1.70E+00	1.12E-03
Phenanthrene	1.26E-04		
Pyrene	1.22E-04		
Vanadium	6.68E-04	4.16E+00	1.61E-04
Zinc	2.28E-01	7.54E+01	3.02E-03
LPAH	1.99E-04	6.56E+01	3.03E-06
HPAH	8.84E-04	6.15E-01	1.44E-03
TOTAL PAHs	1.08E-03		

TABLE C-11
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table C-3

Chemical	Intake	TRV Coyote	EHQ
2-Methylnaphthalene	5.88E-07		
4,4-DDD	1.79E-07	1.47E-01	1.22E-06
4,4'-DDE	9.89E-09	1.47E-01	6.73E-08
4,4'-DDT	3.26E-08	1.47E-01	2.22E-07
Acenaphthene	4.26E-07		
Acenaphthylene	2.64E-07		
Anthracene	4.56E-07		
Antimony	6.48E-06	1.25E-01	5.19E-05
Aroclor-1254	2.72E-06	1.55E-01	1.75E-05
Arsenic	1.70E-05	1.22E+00	1.39E-05
Barium	1.14E-03	4.10E-01	2.78E-03
Benzo(a)anthracene	2.24E-06		
Benzo(a)pyrene	2.67E-06		
Benzo(b)fluoranthene	2.89E-06		
Benzo(g,h,i)perylene	1.82E-06		
Benzo(k)fluoranthene	1.34E-06		
Boron	2.26E-03	2.20E+01	1.03E-04
Cadmium	1.99E-06	7.70E-01	2.58E-06
Chromium	6.13E-05	2.40E+00	2.56E-05
Chrysene	2.48E-06		
Cobalt	9.55E-05		
Copper	3.26E-03	5.60E+00	5.82E-04
Dibenz(a,h)anthracene	6.41E-07		
Dieldrin	3.71E-07	1.50E-02	2.47E-05
Endrin Aldehyde	6.22E-07	9.20E-02	6.76E-06
Endrin Ketone	4.44E-07	9.20E-02	4.83E-06
Fluoranthene	5.17E-06		
Fluorene	3.93E-07		
gamma-Chlordane	3.23E-07	4.60E+00	7.03E-08
Indeno(1,2,3-cd)pyrene	2.41E-06		
Lead	3.59E-04	4.70E+00	7.64E-05
Lithium	4.23E-03	7.50E+00	5.64E-04
Manganese	5.26E-02	7.00E+01	7.51E-04
Mercury	1.39E-07	1.01E+00	1.37E-07
Molybdenum	5.61E-06	1.80E-01	3.12E-05
Naphthalene	9.74E-09		
Nickel	4.29E-05	1.70E+00	2.53E-05
Phenanthrene	3.67E-06		
Pyrene	3.57E-06		
Vanadium	5.97E-05	4.16E+00	1.43E-05
Zinc	2.82E-03	7.54E+01	3.74E-05
LPAH	5.81E-06	6.56E+01	8.85E-08
HPAH	2.58E-05	6.15E-01	4.20E-05
TOTAL PAHs	3.16E-05		

TABLE C-12
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL SOUTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table C-3

Chemical	Intake	TRV Least Shrew	EHQ
2-Methylnaphthalene	1.96E-05		
4,4-DDD	5.22E-05	1.47E-01	3.55E-04
4,4'-DDE	2.89E-06	1.47E-01	1.96E-05
4,4'-DDT	9.52E-06	1.47E-01	6.47E-05
Acenaphthene	1.42E-05		
Acenaphthylene	8.82E-06		
Anthracene	1.52E-05		
Antimony	4.71E-04	1.25E-01	3.77E-03
Aroclor-1254	7.17E-04	1.55E-01	4.63E-03
Arsenic	7.59E-04	2.00E+00	3.80E-04
Barium	8.19E-02	5.18E+01	1.58E-03
Benzo(a)anthracene	5.93E-05		
Benzo(a)pyrene	9.30E-05		
Benzo(b)fluoranthene	1.00E-04		
Benzo(g,h,i)perylene	6.06E-05		
Benzo(k)fluoranthene	4.93E-05		
Boron	5.94E-03	3.70E+01	1.60E-04
Cadmium	3.87E-04	7.70E-01	5.03E-04
Chromium	1.35E-03	2.40E+00	5.62E-04
Chrysene	7.10E-05		
Cobalt	3.61E-03		
Copper	5.29E-03	5.60E+00	9.45E-04
Dibenz(a,h)anthracene	2.19E-05		
Dieldrin	2.37E-05	1.50E-02	1.58E-03
Endrin Aldehyde	2.95E-06	9.20E-02	3.21E-05
Endrin Ketone	2.11E-06	9.20E-02	2.29E-05
Fluoranthene	1.73E-04		
Fluorene	1.31E-05		
gamma-Chlordane	1.53E-06	4.60E+00	3.32E-07
Indeno(1,2,3-cd)pyrene	8.48E-05		
Lead	9.81E-03	4.70E+00	2.09E-03
Lithium	1.11E-02	1.20E+01	9.26E-04
Manganese	3.35E-02	1.15E+02	2.91E-04
Mercury	2.62E-04	1.01E+00	2.59E-04
Molybdenum	1.23E-04	2.90E-01	4.25E-04
Naphthalene	3.25E-07		
Nickel	1.06E-03	1.70E+00	6.23E-04
Phenanthrene	1.23E-04		
Pyrene	1.19E-04		
Vanadium	1.31E-03	4.16E+00	3.15E-04
Zinc	4.02E-01	7.54E+01	5.34E-03
LPAH	1.94E-04	6.56E+01	2.96E-06
HPAH	8.63E-04	6.15E-01	1.40E-03
TOTAL PAHs	1.06E-03		

TABLE C-13
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL SOUTH OF MARLIN
Avian Herbivore/Omnivore (AMERICAN ROBIN)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table C-3

Chemical	Intake	TRV American Robin	EHQ
2-Methylnaphthalene	1.13E-05	0.00E+00	
4,4-DDD	4.54E-05	2.27E-01	2.00E-04
4,4'-DDE	2.81E-06	2.27E-01	1.24E-05
4,4'-DDT	8.69E-06	2.27E-01	3.83E-05
Acenaphthene	1.39E-05	0.00E+00	
Acenaphthylene	8.49E-06	0.00E+00	
Anthracene	1.83E-05	0.00E+00	
Antimony	4.04E-04	0.00E+00	
Aroclor-1254	6.50E-04	1.80E-01	3.61E-03
Arsenic	6.54E-04	2.71E+00	2.41E-04
Barium	7.79E-02	1.91E+01	4.08E-03
Benzo(a)anthracene	5.06E-05	0.00E+00	
Benzo(a)pyrene	8.17E-05	0.00E+00	
Benzo(b)fluoranthene	8.53E-05	0.00E+00	
Benzo(g,h,i)perylene	5.67E-05	0.00E+00	
Benzo(k)fluoranthene	4.81E-05	0.00E+00	
Boron	5.29E-03	1.74E+01	3.04E-04
Cadmium	3.78E-04	1.47E+00	2.57E-04
Chromium	1.21E-03	2.66E+00	4.54E-04
Chrysene	6.04E-05	0.00E+00	
Cobalt	3.29E-03	0.00E+00	
Copper	4.21E-03	4.05E+00	1.04E-03
Dibenz(a,h)anthracene	1.88E-05	0.00E+00	
Dieldrin	2.21E-05	7.09E-02	3.12E-04
Endrin Aldehyde	2.87E-06	1.00E-02	2.87E-04
Endrin Ketone	1.98E-06	1.00E-02	1.98E-04
Fluoranthene	1.57E-04	0.00E+00	
Fluorene	1.17E-05	0.00E+00	
gamma-Chlordane	1.42E-06	2.14E+00	6.64E-07
Indeno(1,2,3-cd)pyrene	7.47E-05	0.00E+00	
Lead	8.37E-03	1.63E+00	5.14E-03
Lithium	9.84E-03	0.00E+00	
Manganese	2.45E-02	9.98E+02	2.46E-05
Mercury	2.44E-04	3.25E+00	7.51E-05
Molybdenum	1.08E-04	1.90E+00	5.70E-05
Naphthalene	2.41E-07	0.00E+00	
Nickel	8.00E-04	6.71E+00	1.19E-04
Phenanthrene	4.23E-01	0.00E+00	
Pyrene	1.04E-04	0.00E+00	
Vanadium	8.52E-04	3.44E-01	2.48E-03
Zinc	3.66E-01	6.61E+01	5.53E-03
LPAH	4.23E-01	0.00E+00	
HPAH	7.65E-04	0.00E+00	
TOTAL PAHs	4.24E-01	0.00E+00	

TABLE C-14
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL SOUTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table C-3

Chemical	Intake	TRV Red-Tailed Hawk	EHQ
2-Methylnaphthalene	8.37E-07		
4,4-DDD	1.19E-08	2.27E-01	5.23E-08
4,4'-DDE	7.10E-08	2.27E-01	3.13E-07
4,4'-DDT	9.82E-08	2.27E-01	4.33E-07
Acenaphthene	1.94E-06		
Acenaphthylene	1.18E-06		
Anthracene	2.88E-06		
Antimony	2.11E-05		
Aroclor-1254	7.29E-06	1.80E-01	4.05E-05
Arsenic	6.09E-05	4.46E+00	1.37E-05
Barium	5.48E-03	3.15E+01	1.74E-04
Benzo(a)anthracene	8.52E-06		
Benzo(a)pyrene	1.03E-05		
Benzo(b)fluoranthene	1.05E-05		
Benzo(g,h,i)perylene	7.69E-06		
Benzo(k)fluoranthene	6.23E-06		
Boron	6.16E-03	2.86E+01	2.15E-04
Cadmium	1.26E-05	1.47E+00	8.59E-06
Chromium	2.52E-04	2.66E+00	9.47E-05
Chrysene	9.29E-06		
Cobalt	2.68E-04		
Copper	8.98E-03	4.05E+00	2.22E-03
Dibenz(a,h)anthracene	2.35E-06		
Dieldrin	1.02E-06	7.09E-02	1.43E-05
Endrin Aldehyde	1.74E-06	1.00E-02	1.74E-04
Endrin Ketone	1.23E-06	1.00E-02	1.23E-04
Fluoranthene	2.09E-05		
Fluorene	1.54E-06		
gamma-Chlordane	8.89E-07	2.14E+00	4.15E-07
Indeno(1,2,3-cd)pyrene	9.09E-06		
Lead	1.38E-03	1.63E+00	8.45E-04
Lithium	1.15E-02		
Manganese	1.43E-01	1.64E+03	8.72E-05
Mercury	6.98E-07	3.25E+00	2.15E-07
Molybdenum	2.25E-05	3.30E+00	6.82E-06
Naphthalene	2.64E-08		
Nickel	1.42E-04	6.71E+00	2.11E-05
Phenanthrene	9.91E-02		
Pyrene	1.34E-05		
Vanadium	1.69E-04	3.44E-01	4.92E-04
Zinc	9.96E-03	6.61E+01	1.51E-04
LPAH	1.58E-05		
HPAH	7.02E-05		
TOTAL PAHs	8.59E-05		

TABLE C-15
CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg)

Cfood = Csoil x BCF (or BAF)

where:

Cfood =	Chemical Concentration in food (mg/kg dry)
Csoil =	Chemical Concentration in soil (mg/kg dry)
BCF	Bioconcentration Factor (unitless)
BAF =	Bioaccumulation Factor (unitless)

Compound	Csoil (mg/kg)	Soil to Earthworm BCF	Earthworm Concentration	Reference	Soil to Arthropod BCF	Arthropod Concentration	Reference	Soil to Plant BAF	Plant/Fruit/Seed Concentration	Reference	Plant to Wildlife BCF	Plant to Deer Mouse Concentration	Reference	Soil to Wildlife BCF	Soil to Deer Mouse Concentration	Reference	TOTAL DEER MOUSE CONCENTRATION	Plant to Bird BCF	Plant to Bird Concentration	Reference	Soil to Bird BCF	Soil to Bird Concentration	Reference	TOTAL BIRD CONCENTRATION
2-Methylnaphthalene	1.60E-01	7.00E-02	1.12E-02	EPA, 1999*	7.00E-02	1.12E-02	EPA, 1999*	2.02E-02	3.23E-03	EPA, 1999*	5.31E-02	1.72E-04	EPA, 1999*	1.27E-04	2.03E-05	EPA, 1999*	1.92E-04	3.11E-02	1.01E-04	EPA, 1999*	9.98E-04	1.60E-04	EPA, 1999*	2.60E-04
4,4-DDD	5.08E-02	1.26E+00	6.40E-02	EPA, 1999	1.26E+00	6.40E-02	EPA, 1999	9.37E-03	4.76E-04	EPA, 1999	2.72E-02	1.29E-05	EPA, 1999	6.52E-05	3.31E-06	EPA, 1999	1.63E-05	1.59E-02	7.57E-06	EPA, 1999	5.10E-04	2.59E-05	EPA, 1999	3.35E-05
4,4'-DDE	2.81E-03	1.26E+00	3.54E-03	EPA, 1999	1.26E+00	3.54E-03	EPA, 1999	9.37E-03	2.63E-05	EPA, 1999	2.72E-02	7.16E-07	EPA, 1999	6.52E-05	1.83E-07	EPA, 1999	8.99E-07	1.59E-02	4.19E-07	EPA, 1999	5.10E-04	1.43E-06	EPA, 1999	1.85E-06
4,4'-DDT	9.27E-03	1.26E+00	1.17E-02	EPA, 1999	1.26E+00	1.17E-02	EPA, 1999	9.37E-03	8.69E-05	EPA, 1999	2.72E-02	2.36E-06	EPA, 1999	6.52E-05	6.04E-07	EPA, 1999	2.97E-06	1.59E-02	1.38E-06	EPA, 1999	5.10E-04	4.73E-06	EPA, 1999	6.11E-06
Acenaphthene	1.16E-01	7.00E-02	8.12E-03	EPA, 1999*	7.00E-02	8.12E-03	EPA, 1999*	2.02E-02	2.34E-03	EPA, 1999*	5.31E-02	1.24E-04	EPA, 1999*	1.27E-04	1.47E-05	EPA, 1999*	1.39E-04	3.11E-02	7.29E-05	EPA, 1999*	9.98E-04	1.16E-04	EPA, 1999*	1.89E-04
Acenaphthylene	7.19E-02	7.00E-02	5.03E-03	EPA, 1999*	7.00E-02	5.03E-03	EPA, 1999*	2.02E-02	1.45E-03	EPA, 1999*	5.31E-02	7.71E-05	EPA, 1999*	1.27E-04	9.13E-06	EPA, 1999*	8.63E-05	3.11E-02	4.52E-05	EPA, 1999*	9.98E-04	7.18E-05	EPA, 1999*	1.17E-04
Anthracene	1.24E-01	7.00E-02	8.68E-03	EPA, 1999*	7.00E-02	8.68E-03	EPA, 1999*	2.02E-02	2.50E-03	EPA, 1999*	5.31E-02	1.33E-04	EPA, 1999*	1.27E-04	1.57E-05	EPA, 1999*	1.49E-04	3.11E-02	7.79E-05	EPA, 1999*	9.98E-04	1.24E-04	EPA, 1999*	2.02E-04
Antimony	1.87E+00	2.20E-01	4.11E-01	Sample, 1998	2.20E-01	4.11E-01	Sample, 199	2.00E-01	3.74E-01	Bechtel, 1998	5.99E-04	2.24E-04	EPA, 1999	1.44E-06	2.69E-06	Sample, 1998a	2.26E-04	5.99E-04	2.24E-04	EPA, 1999*	1.44E-06	2.69E-06	Sample, 1998	2.26E-04
Aroclor-1254	7.73E-01	1.13E+00	8.73E-01	EPA, 1999	1.13E+00	8.73E-01	EPA, 1999	1.00E-02	7.73E-03	EPA, 1999	2.43E-02	1.88E-04	EPA, 1999	5.83E-05	4.51E-05	EPA, 1999	2.33E-04	1.42E-02	1.10E-04	EPA, 1999	4.55E-04	3.52E-04	EPA, 1999	4.61E-04
Arsenic	4.92E+00	1.10E-01	5.41E-01	Sample, 1998	1.10E-01	5.41E-01	Sample, 199	3.60E-02	1.77E-01	Bechtel, 1998	1.20E-03	2.12E-04	EPA, 1999	2.88E-06	1.42E-05	Sample, 1998a	2.27E-04	1.20E-03	2.12E-04	EPA, 1999	2.88E-06	1.42E-05	Sample, 1998	2.27E-04
Barium	3.30E+02	2.20E-01	7.27E+01	Sample, 1998	2.20E-01	7.27E+01	Sample, 199	1.50E-01	4.96E+01	Bechtel, 1998	8.99E-05	4.46E-03	EPA, 1999	2.16E-07	7.14E-05	Sample, 1998a	4.53E-03	8.99E-05	4.46E-03	EPA, 1999	2.16E-07	7.14E-05	Sample, 1998	4.53E-03
Benzo(a)anthracene	6.43E-01	3.00E-02	1.93E-02	EPA, 1999	3.00E-02	1.93E-02	EPA, 1999	2.02E-02	1.30E-02	EPA, 1999	7.19E-03	9.34E-05	EPA, 1999	1.73E-05	1.11E-05	EPA, 1999	1.05E-04	4.20E-03	5.46E-05	EPA, 1999	1.35E-04	8.68E-05	EPA, 1999	1.41E-04
Benzo(a)pyrene	7.63E-01	7.00E-02	5.34E-02	EPA, 1999	7.00E-02	5.34E-02	EPA, 1999	1.01E-02	7.71E-03	EPA, 1999	2.03E-02	1.56E-04	EPA, 1999	4.86E-05	3.71E-05	EPA, 1999	1.94E-04	1.19E-02	9.17E-05	EPA, 1999	3.81E-04	2.91E-04	EPA, 1999	3.82E-04
Benzo(b)fluoranthene	8.22E-01	7.00E-02	5.75E-02	EPA, 1999	7.00E-02	5.75E-02	EPA, 1999	1.01E-02	8.30E-03	EPA, 1999	2.40E-02	1.99E-04	EPA, 1999	5.75E-05	4.73E-05	EPA, 1999	2.47E-04	1.40E-02	1.16E-04	EPA, 1999	4.50E-04	3.70E-04	EPA, 1999	4.86E-04
Benzo(g,h,i)perylene	4.94E-01	7.00E-02	3.46E-02	EPA, 1999*	7.00E-02	3.46E-02	EPA, 1999*	2.02E-02	9.98E-03	EPA, 1999*	5.31E-02	5.30E-04	EPA, 1999*	1.27E-04	6.27E-05	EPA, 1999*	5.93E-04	3.11E-02	3.10E-04	EPA, 1999*	9.98E-04	4.93E-04	EPA, 1999*	8.03E-04
Benzo(k)fluoranthene	3.81E-01	8.00E-02	3.05E-02	EPA, 1999	8.00E-02	3.05E-02	EPA, 1999	1.01E-02	3.85E-03	EPA, 1999	2.39E-02	9.20E-05	EPA, 1999	5.73E-05	2.18E-05	EPA, 1999	1.14E-04	1.39E-02	5.35E-05	EPA, 1999	4.48E-04	1.71E-04	EPA, 1999	2.24E-04
Boron	6.51E+00	1.00E+00	6.51E+00	**	1.00E+00	6.51E+00	**	1.00E+00	6.51E+00	**	1.00E+00	6.51E+00	**	1.00E+00	6.51E+00	**	1.30E+01	1.00E+00	6.51E+00	**	1.00E+00	6.51E+00	**	1.30E+01
Cadmium	4.67E-01	9.60E-01	4.48E-01	Sample, 1998	9.60E-01	4.48E-01	Sample, 199	3.64E-01	1.70E-01	Bechtel, 1998	7.19E-05	1.22E-05	EPA, 1999	1.73E-07	8.08E-08	Sample, 1998a	1.23E-05	4.71E-02	8.01E-03	EPA, 1999	1.51E-03	7.05E-04	EPA, 1999	8.71E-03
Chromium	1.78E+01	1.00E-02	1.78E-01	Sample, 1998	1.00E-02	1.78E-01	Sample, 199	7.50E-03	1.33E-01	Bechtel, 1998	3.30E-03	4.39E-04	EPA, 1999	7.91E-06	1.40E-04	Sample, 1998a	5.80E-04	3.30E-03	4.39E-04	EPA, 1999	7.91E-06	1.40E-04	Sample, 1998	5.80E-04
Chrysene	7.12E-01	4.00E-02	2.85E-02	EPA, 1999	4.00E-02	2.85E-02	EPA, 1999	1.87E-02	1.33E-02	EPA, 1999	8.27E-03	1.10E-04	EPA, 1999	1.99E-05	1.42E-05	EPA, 1999	1.24E-04	4.84E-03	6.44E-05	EPA, 1999	1.55E-04	1.10E-04	EPA, 1999	1.75E-04
Cobalt	4.35E+00	1.00E+00	4.35E+00	**	1.00E+00	4.35E+00	**	7.45E-03	3.24E-02	Bechtel, 1998	1.00E+00	3.24E-02	**	1.00E-01	4.35E-01	Sample, 1998a	4.68E-01	1.00E+00	3.24E-02	**	1.00E-01	4.35E-01	Sample, 1998	4.68E-01
Copper	4.01E+01	4.00E-02	1.60E+00	EPA, 1999	4.00E-02	1.60E+00	EPA, 1999	4.00E-01	1.60E+01	EPA, 1999	1.00E+00	1.60E+01	**	5.25E-02	2.10E+00	Sample, 1998a	1.81E+01	1.00E+00	1.60E+01	**	5.25E-02	2.10E+00	Sample, 1998	1.81E+01
Dibenz(a,h)anthracene	1.80E-01	7.00E-02	1.26E-02	EPA, 1999	7.00E-02	1.26E-02	EPA, 1999	6.40E-03	1.15E-03	EPA, 1999	5.31E-02	6.12E-05	EPA, 1999	1.27E-04	2.29E-05	EPA, 1999	8.40E-05	3.11E-02	3.58E-05	EPA, 1999	9.98E-04	1.80E-04	EPA, 1999	2.15E-04
Dieldrin	2.11E-03	1.47E+01	3.10E-02	EPA, 2005f	1.47E+01	3.10E-02	EPA, 2005f	3.49E-02	7.36E-05	EPA, 1998	5.65E-03	4.16E-07	EPA, 1998	1.00E+00	2.11E-03	**	2.11E-03	3.68E-03	2.71E-07	EPA, 1998	1.00E+00	2.11E-03	**	2.11E-03
Endrin Aldehyde	3.54E-03	1.00E+00	3.54E-03	**	1.00E+00	3.54E-03	**	5.76E-02	2.04E-04	EPA, 1998	2.37E-03	4.83E-07	EPA, 1998	1.00E+00	3.54E-03	**	3.54E-03	1.55E-03	3.16E-07	EPA, 1998	1.00E+00	3.54E-03	**	3.54E-03
Edrin Ketone	2.53E-03	1.00E+00	2.53E-03	**	1.00E+00	2.53E-03	**	5.76E-02	1.46E-04	EPA, 1998	2.37E-03	3.45E-07	EPA, 1998	1.00E+00	2.53E-03	**	2.53E-03	1.55E-03	2.26E-07	EPA, 1998	1.00E+00	2.53E-03	**	2.53E-03
Fluoranthene	1.41E+00	7.00E-02	9.86E-02	EPA, 1999*	7.00E-02	9.86E-02	EPA, 1999*	2.02E-02	2.84E-02	EPA, 1999*	5.31E-02	1.51E-03	EPA, 1999*	1.27E-04	1.79E-04	EPA, 1999*	1.69E-03	3.11E-02	8.85E-04	EPA, 1999*	9.98E-04	1.41E-03	EPA, 1999*	2.29E-03
Fluorene	1.07E-01	7.00E-02	7.49E-03	EPA, 1999*	7.00E-02	7.49E-03	EPA, 1999*	2.02E-02	2.16E-03	EPA, 1999*	5.31E-02	1.15E-04	EPA, 1999*	1.27E-04	1.36E-05	EPA, 1999*	1.28E-04	3.11E-02	6.72E-05	EPA, 1999*	9.98E-04	1.07E-04	EPA, 1999*	1.74E-04
gamma-Chlordane	1.84E-03	1.00E+00	1.84E-03	**	1.00E+00	1.84E-03	**	1.43E-02	2.63E-05	EPA, 1998	2.63E-02	6.92E-07	EPA, 1998	1.00E+00	1.84E-03	**	1.84E-03	1.72E-02	4.53E-07	EPA, 1998	1.00E+00	1.84E-03	**	1.84E-03
Indeno(1,2,3-cd)pyrene	6.58E-01	8.00E-02	5.26E-02	EPA, 1999	8.00E-02	5.26E-02	EPA, 1999	3.90E-03	2.57E-03	EPA, 1999	1.24E-01	3.18E-04	EPA, 1999	2.98E-04	1.96E-04	EPA, 1999	5.14E-04	7.24E-02	1.86E-04	EPA, 1999	2.32E-03	1.53E-03	EPA, 1999	1.71E-03
Lead	1.04E+02	3.00E-02	3.12E+00	EPA, 1999	3.00E-02	3.12E+00	EPA, 1999	4.50E-02	4.68E+00	EPA, 1999	1.80E-04	8.42E-04	EPA, 1999	4.32E-07	4.49E-05	EPA, 1999	8.87E-04	1.80E-04	8.42E-04	EPA, 1999	4.32E-07	4.49E-05	EPA, 1999	8.87E-04
Lithium	1.22E+01	1.00E+00	1.22E+01	**	1.00E+00	1.22E+01	**	1.00E+00	1.22E+01	**	1.00E+00	1.22E+01	**	1.00E+00	1.22E+01	**	2.43E+01	1.00E+00	1.22E+01	**	1.00E+00	1.22E+01	**	2.43E+01
Manganese	2.78E+02	6.05E-02	1.68E+01	Sample, 1998	6.05E-02	1.68E+01	Sample, 199	7.92E-02	2.20E+01	Bechtel, 1998	1.00E+00	2.20E+01	**	1.00E+00	2.78E+02	**	3.00E+02	1.00E+00	2.20E+01	**	1.00E+00	2.78E+02	**	3.00E+02
Mercury	4.00E-02	8.50E+00	3.40E-01	Sample, 1998	8.50E+00	3.40E-01	Sample, 199	1.37E-01	5.48E-03	Bechtel, 1998	4.68E-04	2.56E-06	EPA, 1999	1.12E-06	4.48E-08	Sample, 1998a	2.61E-06	1.59E-03	8.71E-06	EPA, 1999	5.12E-05	2.05E-06	EPA, 1999	1.08E-05
Molybdenum	1.62E+00	1.00E-02	1.62E-02	Sample, 1998	1.00E-02	1.62E-02	Sample, 199	7.50E-03	1.22E-02	Bechtel, 1998	3.30E-03	4.02E-05	EPA, 1999	7.91E-06	1.28E-05	Sample, 1998a	5.30E-05	3.30E-03	4.02E-05	EPA, 1999	7.91E-06	1.28E-05	Sample, 1998	5.30E-05
Naphthalene	2.65E-03	7.00E-02	1.86E-04	EPA, 1999*	7.00E-02	1.86E-04	EPA, 1999*	2.02E-02	5.35E-05	EPA, 1999*	5.31E-02	2.84E-06	EPA, 1999*	1.27E-04	3.37E-07	EPA, 1999*	3.18E-06	3.11E-02	1.66E-06	EPA, 1999*	9.98E-04	2.64E-06	EPA, 1999*	4.31E-06
Nickel	1.24E+01	2.00E-02	2.47E-01	EPA, 1999	2.00E-02	2.47E-01	EPA, 1999	3.20E-02	3.96E-01	EPA, 1999	3.60E-03	1.43E-03	EPA, 1999	8.63E-06	1.07E-04	EPA, 1999	1.53E-03	3.60E-03	1.43E-03	EPA, 1999	8.63E-06	1.07E-04	EPA, 1999	1.53E-03
Phenanthrene	9.99E-01	7.00E-02	6.99E-02	EPA, 1999*	7.00E-02	6.99E-02	EPA, 1999*	2.02E-02	2.02E-02	EPA, 1999*	5.31E-02	1.07E-03	EPA, 1999*	1.27E-04	1.27E-04	EPA, 1999*	1.20E-03	3.11E-02	6.28E-04	EPA, 1999*	9.98E-04	9.97E-04	EPA, 1999*	1.62E-03
Pyrene	9.71E-01	7.00E-02	6.80E-02	EPA, 1999*	7.00E-02	6.80E-02	EPA, 1999*	2.02E-02	1.96E-02	EPA, 1999*	5.31E-02	1.04E-03	EPA, 1999*	1.27E-04	1.23E-04	EPA, 1999*	1.16E-03	3.11E-02	6.10E-04	EPA, 1999*	9.98E-04	9.69E-04	EPA, 1999*	1.58E-03
Vanadium	1.73E+01	1.00E-02	1.73E-01	Sample, 1998	1.00E-02	1.73E-01	Sample, 199	7.50E-03	1.30E-01	Bechtel, 1998	3.30E-03	4.27E-04	EPA, 1999	7.91E-06	1.37E-04	Sample, 1998a	5.64E-04	3.30E-03	4.27E-04	EPA, 1999	7.91E-06	1.37E-04	Sample, 1998	5.64E-04
Zinc	8.15E+02	5.60E-01	4.57E+02	EPA, 1999	5.60E-01	4.57E+02	EPA, 1999	1.20E-12	9.78E-10	EPA, 1999	5.39E-05	5.27E-14	EPA, 1999	1.29E-07	1.05E-04	EPA, 1999	1.05E-04	3.89E-03	3.81E-12	EPA, 1999	1.25E-04	1.02E-01	EPA, 1999	1.02E-01
LPAH	1.58E+00	7.00E-02	1.11E-01	EPA, 1999*	7.00E-02	1.11E-01	EPA, 1999*	2.02E-02	3.19E-02	EPA, 1999*	5.31E-02	1.70E-03	EPA, 1999*	1.27E-04	2.01E-04	EPA, 1999*	1.90E-03	3.11E-02	9.93E-04	EPA, 1999*	9.98E-04	1.58E-03	EPA, 1999*	2.57E-03
HPAH	7.03E+00	7.00E-02	4.92E-01	EPA, 1999*	7.00E-02	4.92E-01	EPA, 1999*	2.02E-02	1.42E-01	EPA, 1999*	5.31E-02	7.54E-03	EPA, 1999*	1.27E-04	8.93E-04	EPA, 1999*	8.44E-03	3.11E-02	4.42E-03	EPA, 1999*	9.98E-04	7.02E-03	EPA, 1999*	1.14E-02
TOTAL PAHs	8.61E+00	7.00E-02	6.03E-01	EPA, 1999*	7.00E-02	6.03E-01	EPA, 1999*	2.00E-02	1.72E-01	EPA, 1999*	5.31E-02	9.15E-03	EPA, 1999*	1.27E-04	1.09E-03	EPA, 1999*	1.02E-02	3.11E-02	5.36E-03	EPA, 1999*	9.98E-04	8.60E-03	EPA, 1999*	1.40E-02

Notes:
For vanadium and molybdenum, the BCF values for chromium were used since they are in transitional elements with similar properties.
* For BAFs and BCFs for LPAHs and HPAHs, the most conservative value for the individual PAHs was used to estimated food concentrations.
**If no BAF or BCF was available in the literature, a default value of 1.0 was used.

TABLE D-1
EXPOSURE POINT CONCENTATION (mg/kg)
SOIL NORTH OF MARLIN AVE.*

Parameter	Exposure Point Concentration	Statistic Used
2-Methylnaphthalene	< 1.18E-02	median
4,4'-DDE	< 4.27E-04	median
4,4'-DDT	8.18E-02	97.5% KM (Chebyshev)
Acenaphthene	< 1.10E-02	median
Acenaphthylene		NC
Anthracene	< 1.20E-02	median
Antimony	2.63E+00	95% KM (Bootstrap)
Aroclor-1254	< 4.30E-03	median
Barium	2.08E+02	95% Chebyshev
Benzo(a)anthracene	< 1.11E-02	median
Benzo(a)pyrene	3.87E-01	97.5% KM (Chebyshev)
Benzo(b)fluoranthene	2.60E-01	95% KM (Bootstrap)
Benzo(g,h,i)perylene	3.50E-01	97.5% KM (Chebyshev)
Benzo(k)fluoranthene	< 1.72E-02	median
Boron	1.60E+01	97.5% KM (Chebyshev)
Cadmium	4.78E-01	97.5% KM (Chebyshev)
Chromium	2.27E+01	95% Student's-t
Chrysene	3.94E-01	97.5% KM (Chebyshev)
Copper	4.48E+01	95% Chebyshev
Dibenz(a,h)anthracene	< 1.09E-02	median
Dieldrin		NC
Endrin		NC
Endrin Ketone		NC
Fluoranthene	< 6.46E-01	97.5% KM (Chebyshev)
Fluorene	< 1.08E-02	median
Indeno(1,2,3-cd)pyrene	4.06E-01	97.5% KM (Chebyshev)
Lead	9.54E+01	95% Chebyshev
Lithium	2.05E+01	95% Student's-t
Manganese	5.59E+02	97.5% Chebyshev
Mercury	2.46E-02	97.5% KM (Chebyshev)
Molybdenum	2.42E+00	97.5% KM (Chebyshev)
Naphthalene	< 3.63E-03	median
Nickel	1.91E+01	95% Student's-t
Phenanthrene	5.84E-01	97.5% KM (Chebyshev)
Pyrene	1.15E+00	97.5% KM (Chebyshev)
Vanadium	2.29E+01	95% Student's-t
Zinc	1.18E+03	97.5% Chebyshev
LPAH	6.33E-01	
HPAH	3.63E+00	
TOTAL PAHs	4.26E+00	

Notes:
NC - Not a COPEC because it was not measured in greater than five percent of all Nort
* Soil data includes soil collected from 0 to 2 feet below ground surface.

th Area soils.

TABLE D-2
EXPOSURE POINT CONCENTATION (mg/kg)
SURFACE SOIL NORTH OF MARLIN AVE.*

Parameter	Exposure Point Concentration	Statistic Used
2-Methylnaphthalene	< 1.18E-02	median
4,4'-DDE	< 4.00E-04	median
4,4'-DDT	< 5.00E-04	median
Acenaphthene	< 1.10E-02	median
Acenaphthylene	< 1.21E-02	median
Anthracene	< 1.21E-02	median
Antimony	4.95E+00	97.5% KM (Chebyshev)
Aroclor-1254	< 4.29E-03	median
Barium	2.64E+02	95% Chebyshev
Benzo(a)anthracene	< 1.10E-02	median
Benzo(a)pyrene	< 1.16E-02	median
Benzo(b)fluoranthene	3.73E-01	95% KM (BCA)
Benzo(g,h,i)perylene	5.92E-01	97.5% KM (Chebyshev)
Benzo(k)fluoranthene	< 1.75E-02	median
Boron	2.21E+01	97.5% KM (Chebyshev)
Cadmium	5.72E-01	97.5% KM (Chebyshev)
Chromium	4.86E+01	95% Chebyshev
Chrysene	< 1.03E-02	median
Copper	7.00E+01	95% Chebyshev
Dibenz(a,h)anthracene	< 1.10E-02	median
Dieldrin	< 1.83E-04	median
Endrin	< 2.22E-04	median
Endrin Ketone	< 5.48E-04	median
Fluoranthene	< 1.28E-02	median
Fluorene	< 1.09E-02	median
Indeno(1,2,3-cd)pyrene	6.82E-01	97.5% KM (Chebyshev)
Lead	2.21E+02	97.5% Chebyshev
Lithium	1.87E+01	95% Student's-t
Manganese	7.34E+02	97.5% KM (Chebyshev)
Mercury	3.75E-02	97.5% KM (Chebyshev)
Molybdenum	4.71E+00	97.5% KM (Chebyshev)
Naphthalene		NS
Nickel	2.08E+01	95% Student's-t
Phenanthrene	< 1.42E-02	median
Pyrene	2.03E+00	97.5% KM (Chebyshev)
Vanadium	2.34E+01	95% Student's-t
Zinc	2.34E+03	97.5% Chebyshev
LPAH	7.21E-02	
HPAH	3.75E+00	
TOTAL PAHs	3.83E+00	

Notes:
* Surface soil data includes soil collected from 0 to 0.5 feet below ground surface.
NS - Not sampled in surface soil.

TABLE D-3
TOXICITY REFERENCE VALUES

Parameter	Invertebrate (Earthworm) (mg/kg)	Ref.	Comments	Small Mammalian Herbivore (Deer Mouse) (mg/kgBW-day)	Ref.	Comments	Large Mammalian Carnivore (Coyote) (mg/kgBW-day)	Ref.	Comments	Small Mammalian Omnivore (Least Shrew) (mg/kgBW-day)	Ref.	Comments	Avian Herbivore/Omnivore (American Robin) (mg/kgBW-day)	Ref.	Comments	Large Avian Carnivore (Red-tailed Hawk) (mg/kgBW-day)	Ref.	Comments
2-Methylnaphthalene																		
4,4'-DDE	4.30E-02	EPA, 2007a	Acute median LC50 in common cricket (dose 4.3 with uncertainty factor of 0.01)	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
4,4'-DDT	4.30E-02	EPA, 2007a	Acute median LC50 in common cricket (dose 4.3 with uncertainty factor of 0.01)	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Acenaphthene																		
Acenaphthylene																		
Anthracene																		
Antimony	3.00E+01	EPA, 2005a	EC20 for earthworms	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1						
Aroclor-1254	2.51E+00	EPA, 1999	Acute median LC50 in earthworms (dose 251 with uncertainty factor of 0.01)	1.55E-01	Sample, 1996	Chronic LOAEL for reproduction in mouse with an uncertainty factor of 0.1	1.55E-01	Sample, 1996	Chronic LOAEL for reproduction in mouse with an uncertainty factor of 0.1	1.55E-01	Sample, 1996	Chronic LOAEL for reproduction in mouse with an uncertainty factor of 0.1	1.80E-01	Sample, 1996		1.80E-01	Sample, 1996	
Barium	3.30E+02	EPA, 2005g	Geometric mean of the EC20 values for three test species under three separate test conditions of pH	5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	1.91E+01	EPA, 1999		3.15E+01	EPA, 1999	
Benzo(a)anthracene																		
Benzo(a)pyrene																		
Benzo(b)fluoranthene																		
Benzo(g,h,i)perylene																		
Benzo(k)fluoranthene																		
Boron				3.40E+01	Sample, 1996		2.20E+01	Sample, 1996		3.70E+01	Sample, 1996		1.74E+01	Sample, 1996		2.86E+01	Sample, 1996	
Cadmium	1.00E+01	EPA, 1999	Chronic (4-month) NOAEL for cocoon production in earthworm (dose 10)	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth
Chromium	5.70E+01	EPA, 2005c	Maximum acceptable toxicant concentration (MATC) for reproductive effects in earthworm	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.66E+00	EPA, 2005c	Geometric mean of the NOAEL values for reproduction and growth	2.66E+00	EPA, 2005c	Geometric mean of the NOAEL values for reproduction and growth
Chrysene																		
Copper	8.00E+01	EPA, 2007c	Geometric mean of the MATC and EC10 values for six test species under different test species	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Dibenz(a,h)anthracene																		
Dieldrin				1.50E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.50E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.50E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.09E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.09E-02	EPA, 2005f	Highest bounded NOAEL for growth lower than the lowest bounded LOAEL for reproduction, growth, and survival

TABLE D-3
TOXICITY REFERENCE VALUES

Parameter	Invertebrate (Earthworm) (mg/kg)	Ref.	Comments	Small Mammalian Herbivore (Deer Mouse) (mg/kgBW-day)	Ref.	Comments	Large Mammalian Carnivore (Coyote) (mg/kgBW-day)	Ref.	Comments	Small Mammalian Omnivore (Least Shrew) (mg/kgBW-day)	Ref.	Comments	Avian Herbivore/Omnivore (American Robin) (mg/kgBW-day)	Ref.	Comments	Large Avian Carnivore (Red-tailed Hawk) (mg/kgBW-day)	Ref.	Comments
Endrin				9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1
Endrin Ketone				9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	9.20E-02	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1
Fluoranthene																		
Fluorene																		
Indeno(1,2,3-cd)pyrene																		
Lead	1.70E+03	EPA, 2005e	Geometric mean of MATC values for one test species under different pH	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Lithium				1.10E+01	Sample, 1996		7.50E+00	Sample, 1996		1.20E+01	Sample, 1996							
Manganese				1.06E+02	Sample, 1996		7.00E+01	Sample, 1996		1.15E+02	Sample, 1996		9.98E+02	Sample, 1996		1.64E+03	Sample, 1996	
Mercury	2.50E+00	EPA, 1999	Toxicity value not available -- TRV for methyl mercury was used as a surrogate	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)
Molybdenum				2.70E-01	Sample, 1996		1.80E-01	Sample, 1996		2.90E-01	Sample, 1996		1.90E+00	Sample, 1996		3.30E+00	Sample, 1996	
Naphthalene																		
Nickel	2.80E+02	EPA, 2007d	Geometric mean of MATC values for five species under different test conditions	1.70E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.70E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.70E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Phenanthrene																		
Pyrene																		
Vanadium	1.00E+02	EPA, 2005d	LOAEC/NOAEC for growth in brocolli -- used as a surrogate for invertebrates	4.16E+00	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.16E+00	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.16E+00	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	3.44E-01	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	3.44E-01	EPA, 2005d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Zinc	1.20E+02	EPA, 2007e	Geometric mean of the MATC and EC10 values for three test species under different test species	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups
LPAH	2.90E+01	EPA, 2007b		6.56E+01	EPA, 2007b	NOAEL for growth and reproduction lower than the lowest bounded	6.56E+01	EPA, 2007b	NOAEL for growth and reproduction lower than the lowest bounded	6.56E+01	EPA, 2007b	NOAEL for growth and reproduction lower than the						
HPAH	1.80E+01	EPA, 2007b		6.15E-01	EPA, 2007b	NOAEL for growth and reproduction lower than the lowest bounded	6.15E-01	EPA, 2007b	NOAEL for growth and reproduction lower than the lowest bounded	6.15E-01	EPA, 2007b	NOAEL for growth and reproduction lower than the						
TOTAL PAHs																		

Notes:
EPA, 2007a -- DDT
EPA, 2007b -- PAHs
EPA, 2007c -- Copper
EPA, 2007d -- Nickel
EPA, 2007e -- Zinc
EPA, 2005a -- Antimony
EPA, 2005b -- Cadmium
EPA, 2005c -- Chromium
EPA, 2005d -- Vanadium
EPA, 2005e -- Lead
EPA, 2005f -- Dieldrin
EPA, 2005g -- Barium

TABLE D-4
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL NORTH OF MARLIN
Invertebrate (EARTHWORM)

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Soil Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table D-3

Chemical		Exposure Point Concentration* (Sc)	TRV (earthworm)	Maximum EHQ+
2-Methylnaphthalene		1.04E+00		
4,4'-DDE		1.49E-02	4.30E-02	3.47E-01
4,4'-DDT		3.95E-01	4.30E-02	9.19E+00
Acenaphthene		1.57E-01		
Acenaphthylene	max surface soil	5.50E-02		
Anthracene		2.64E-01		
Antimony		8.09E+00	3.00E+01	2.70E-01
Aroclor-1254		6.35E+00	2.51E+00	2.53E+00
Barium		4.76E+02	3.30E+02	1.44E+00
Benzo(a)anthracene		1.18E+00		
Benzo(a)pyrene		1.42E+00		
Benzo(b)fluoranthene		1.62E+00		
Benzo(g,h,i)perylene		1.28E+00		
Benzo(k)fluoranthene		7.99E-01		
Boron		3.92E+01		
Cadmium		8.00E-01	1.00E+01	8.00E-02
Chromium		1.28E+02	5.70E+01	2.25E+00
Chrysene		1.30E+00		
Copper		2.00E+02	8.00E+01	2.50E+00
Dibenz(a,h)anthracene		4.04E-01		
Dieldrin	max surface soil	5.45E-03		
Endrin	max surface soil	1.49E-03		
Endrin Ketone	max surface soil	9.66E-03		
Fluoranthene		2.19E+00		
Fluorene		1.21E+00		
Indeno(1,2,3-cd)pyrene		1.51E+00		
Lead		4.71E+02	1.70E+03	2.77E-01
Lithium		3.22E+01		
Manganese		1.21E+03		
Mercury		6.40E-02	2.50E+00	2.56E-02
Molybdenum		1.07E+01		
Naphthalene		1.48E-01		
Nickel		5.17E+01	2.80E+02	1.85E-01
Phenanthrene		1.83E+00		
Pyrene		4.64E+00		
Vanadium		4.58E+01	1.00E+02	4.58E-01
Zinc		5.64E+03	1.20E+02	4.70E+01
LPAH		6.33E-01	2.90E+01	2.18E-02
HPAH		1.36E+01	1.80E+01	7.54E-01
TOTAL PAHs		1.42E+01		

Notes:
*EPC for sedentary receptor is maximum measured concentration.
+Shading indicates HQ>1

TABLE D-5
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	See Table D-1	
IR	Maximum Ingestion rate of soil (kg/day)*	1.50E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.50E+02	avis and Schmidly, 2009

Chemical		Sc	Intake
2-Methylnaphthalene		1.18E-02	1.18E-10
4,4'-DDE		4.27E-04	4.27E-12
4,4'-DDT		8.18E-02	8.18E-10
Acenaphthene		1.10E-02	1.10E-10
Acenaphthylene	surface soil	1.21E-02	1.21E-10
Anthracene		1.20E-02	1.20E-10
Antimony		2.63E+00	2.63E-08
Aroclor-1254		4.30E-03	4.30E-11
Barium		2.08E+02	2.08E-06
Benzo(a)anthracene		1.11E-02	1.11E-10
Benzo(a)pyrene		3.87E-01	3.87E-09
Benzo(b)fluoranthene		2.60E-01	2.60E-09
Benzo(g,h,i)perylene		3.50E-01	3.50E-09
Benzo(k)fluoranthene		1.72E-02	1.72E-10
Boron		1.60E+01	1.60E-07
Cadmium		4.78E-01	4.78E-09
Chromium		2.27E+01	2.27E-07
Chrysene		3.94E-01	3.94E-09
Copper		4.48E+01	4.48E-07
Dibenz(a,h)anthracene		1.09E-02	1.09E-10
Dieldrin	surface soil	1.83E-04	1.83E-12
Endrin	surface soil	2.22E-04	2.22E-12
Endrin Ketone	surface soil	5.48E-04	5.48E-12
Fluoranthene		6.46E-01	6.46E-09
Fluorene		1.08E-02	1.08E-10
Indeno(1,2,3-cd)pyrene		4.06E-01	4.06E-09
Lead		9.54E+01	9.54E-07
Lithium		2.05E+01	2.05E-07
Manganese		5.59E+02	5.59E-06
Mercury		2.46E-02	2.46E-10
Molybdenum		2.42E+00	2.42E-08
Naphthalene		3.63E-03	3.63E-11
Nickel		1.91E+01	1.91E-07
Phenanthrene		5.84E-01	5.84E-09
Pyrene		1.15E+00	1.15E-08
Vanadium		2.29E+01	2.29E-07
Zinc		1.18E+03	1.18E-05
LPAH		6.33E-01	6.33E-09
HPAH		3.63E+00	3.63E-08
TOTAL PAHs		4.26E+00	4.26E-08

TABLE D-5
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

FOOD INGESTION

INTAKE = ((Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ca	Arthropod concentration (mg/kg)	see Table D-15	
Cp	Plant concentration (mg/kg)	see Table D-15	
IR	Maximum Ingestion rate of of food (kg/day)*	7.49E-05	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	1.00E-01	Prof Judgment
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	9.00E-01	Prof Judgment
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.50E-02	avis and Schmidly, 2009

Chemical	Arthropod	Plant	Intake
2-Methylnaphthalene	8.26E-04	2.38E-04	1.48E-06
4,4'-DDE	5.38E-04	4.00E-06	2.87E-07
4,4'-DDT	1.03E-01	7.66E-04	5.49E-05
Acenaphthene	7.70E-04	2.22E-04	1.38E-06
Acenaphthylene	8.47E-04	2.44E-04	1.52E-06
Anthracene	8.40E-04	2.42E-04	1.51E-06
Antimony	5.79E-01	5.27E-01	2.66E-03
Aroclor-1254	4.86E-03	4.30E-05	2.62E-06
Barium	4.58E+01	3.13E+01	1.63E-01
Benzo(a)anthracene	3.33E-04	2.24E-04	1.17E-06
Benzo(a)pyrene	2.71E-02	3.91E-03	3.11E-05
Benzo(b)fluoranthene	1.82E-02	2.63E-03	2.09E-05
Benzo(g,h,i)perylene	2.45E-02	7.07E-03	4.40E-05
Benzo(k)fluoranthene	1.38E-03	1.74E-04	1.47E-06
Boron	1.60E+01	1.60E+01	7.96E-02
Cadmium	4.59E-01	1.74E-01	1.01E-03
Chromium	2.27E-01	1.70E-01	8.78E-04
Chrysene	1.58E-02	7.37E-03	4.10E-05
Copper	1.79E+00	1.79E+01	8.15E-02
Dibenz(a,h)anthracene	7.63E-04	6.98E-05	6.94E-07
Dieldrin	2.69E-03	6.39E-06	1.37E-06
Endrin	2.22E-04	1.28E-05	1.68E-07
Endrin Ketone	5.48E-04	3.16E-05	4.15E-07
Fluoranthene	4.52E-02	1.30E-02	8.12E-05
Fluorene	7.56E-04	2.18E-04	1.36E-06
Indeno(1,2,3-cd)pyrene	3.25E-02	1.58E-03	2.33E-05
Lead	2.86E+00	4.29E+00	2.07E-02
Lithium	2.05E+01	2.05E+01	1.02E-01
Manganese	3.38E+01	4.43E+01	2.16E-01
Mercury	2.09E-01	3.37E-03	1.20E-04
Molybdenum	2.42E-02	1.82E-02	9.36E-05
Naphthalene	2.54E-04	7.33E-05	4.56E-07
Nickel	3.82E-01	6.11E-01	2.94E-03
Phenanthrene	4.09E-02	1.18E-02	7.34E-05
Pyrene	8.04E-02	2.32E-02	1.44E-04
Vanadium	2.29E-01	1.72E-01	8.85E-04
Zinc	6.61E+02	1.42E-09	3.30E-01
LPAH	4.43E-02	1.28E-02	7.96E-05
HPAH	2.54E-01	7.34E-02	4.57E-04
TOTAL PAHs	2.99E-01	8.53E-02	5.32E-04

TABLE D-5
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.48E-06
4,4'-DDE	2.87E-07
4,4'-DDT	5.49E-05
Acenaphthene	1.38E-06
Acenaphthylene	1.52E-06
Anthracene	1.51E-06
Antimony	2.66E-03
Aroclor-1254	2.62E-06
Barium	1.63E-01
Benzo(a)anthracene	1.17E-06
Benzo(a)pyrene	3.11E-05
Benzo(b)fluoranthene	2.09E-05
Benzo(g,h,i)perylene	4.40E-05
Benzo(k)fluoranthene	1.47E-06
Boron	7.96E-02
Cadmium	1.01E-03
Chromium	8.79E-04
Chrysene	4.10E-05
Copper	8.15E-02
Dibenz(a,h)anthracene	6.95E-07
Dieldrin	1.37E-06
Endrin	1.68E-07
Endrin Ketone	4.15E-07
Fluoranthene	8.12E-05
Fluorene	1.36E-06
Indeno(1,2,3-cd)pyrene	2.33E-05
Lead	2.07E-02
Lithium	1.02E-01
Manganese	2.16E-01
Mercury	1.20E-04
Molybdenum	9.37E-05
Naphthalene	4.56E-07
Nickel	2.94E-03
Phenanthrene	7.34E-05
Pyrene	1.44E-04
Vanadium	8.85E-04
Zinc	3.30E-01
LPAH	7.96E-05
HPAH	4.57E-04
TOTAL PAHs	5.32E-04

Notes:
* Expressed in dry weight.

TABLE D-6
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table D-1	
IR	Maximum Ingestion rate of soil (kg/day)*	4.83E-05	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.40E+01	avis and Schmidly, 2009

Chemical		Sc	Intake
2-Methylnaphthalene		1.18E-02	4.07E-08
4,4'-DDE		4.27E-04	1.47E-09
4,4'-DDT		8.18E-02	2.82E-07
Acenaphthene		1.10E-02	3.80E-08
Acenaphthylene	surface soil	1.21E-02	4.17E-08
Anthracene		1.20E-02	4.14E-08
Antimony		2.63E+00	9.08E-06
Aroclor-1254		4.30E-03	1.48E-08
Barium		2.08E+02	7.19E-04
Benzo(a)anthracene		1.11E-02	3.83E-08
Benzo(a)pyrene		3.87E-01	1.34E-06
Benzo(b)fluoranthene		2.60E-01	8.97E-07
Benzo(g,h,i)perylene		3.50E-01	1.21E-06
Benzo(k)fluoranthene		1.72E-02	5.93E-08
Boron		1.60E+01	5.50E-05
Cadmium		4.78E-01	1.65E-06
Chromium		2.27E+01	7.83E-05
Chrysene		3.94E-01	1.36E-06
Copper		4.48E+01	1.55E-04
Dibenz(a,h)anthracene		1.09E-02	3.76E-08
Dieldrin	surface soil	1.83E-04	6.31E-10
Endrin	surface soil	2.22E-04	7.66E-10
Endrin Ketone	surface soil	5.48E-04	1.89E-09
Fluoranthene		6.46E-01	2.23E-06
Fluorene		1.08E-02	3.73E-08
Indeno(1,2,3-cd)pyrene		4.06E-01	1.40E-06
Lead		9.54E+01	3.29E-04
Lithium		2.05E+01	7.07E-05
Manganese		5.59E+02	1.93E-03
Mercury		2.46E-02	8.49E-08
Molybdenum		2.42E+00	8.35E-06
Naphthalene		3.63E-03	1.25E-08
Nickel		1.91E+01	6.59E-05
Phenanthrene		5.84E-01	2.01E-06
Pyrene		1.15E+00	3.96E-06
Vanadium		2.29E+01	7.89E-05
Zinc		1.18E+03	4.07E-03
LPAH		6.33E-01	2.18E-06
HPAH		3.63E+00	1.25E-05
TOTAL PAHs		4.26E+00	1.47E-05

TABLE D-6
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

FOOD INGESTION

INTAKE = ((Cm * IR * Dfm * AUF)/(BW) + (Cb * IR * DFb * AUF) / (BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cm	Mammal concentration (mg/kg)	see Table D-15	
Cb	Bird concentration (mg/kg)	see Table D-15	
IR	Maximum Ingestion rate of of food (kg/day)*	2.41E-03	EPA, 1993
Dfm	Dietary fraction of small mammals (unitless)	7.50E-01	EPA, 1993
Dfb	Dietary fraction of birds (unitless)	2.50E-01	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.40E+01	EPA, 1993

Chemical	Mammal	Bird	Intake
2-Methylnaphthalene	1.42E-05	1.92E-05	2.65E-09
4,4'-DDE	1.37E-07	2.81E-07	2.98E-11
4,4'-DDT	2.62E-05	5.39E-05	5.70E-09
Acenaphthene	1.32E-05	1.79E-05	2.47E-09
Acenaphthylene	1.45E-05	1.97E-05	2.72E-09
Anthracene	1.44E-05	1.95E-05	2.70E-09
Antimony	3.19E-04	3.19E-04	5.50E-08
Aroclor-1254	1.30E-06	2.57E-06	2.78E-10
Barium	2.86E-03	2.86E-03	4.92E-07
Benzo(a)anthracene	1.80E-06	2.44E-06	3.38E-10
Benzo(a)pyrene	9.82E-05	1.94E-04	2.10E-08
Benzo(b)fluoranthene	7.80E-05	1.54E-04	1.67E-08
Benzo(g,h,i)perylene	4.20E-04	5.69E-04	7.87E-08
Benzo(k)fluoranthene	5.14E-06	1.01E-05	1.10E-09
Boron	3.19E+01	3.19E+01	5.49E-03
Cadmium	1.26E-05	8.92E-03	3.85E-07
Chromium	7.41E-04	7.41E-04	1.28E-07
Chrysene	6.88E-05	9.67E-05	1.30E-08
Copper	2.03E+01	2.03E+01	3.49E-03
Dibenz(a,h)anthracene	5.09E-06	1.30E-05	1.22E-09
Dieldrin	1.83E-04	1.83E-04	3.15E-08
Endrin	2.22E-04	2.22E-04	3.82E-08
Endrin Ketone	5.48E-04	5.48E-04	9.43E-08
Fluoranthene	7.75E-04	1.05E-03	1.45E-07
Fluorene	1.30E-05	1.76E-05	2.43E-09
Indeno(1,2,3-cd)pyrene	3.17E-04	1.06E-03	8.64E-08
Lead	8.14E-04	8.14E-04	1.40E-07
Lithium	4.10E+01	4.10E+01	7.06E-03
Manganese	6.04E+02	6.04E+02	1.04E-01
Mercury	1.60E-06	6.62E-06	4.92E-10
Molybdenum	7.90E-05	7.90E-05	1.36E-08
Naphthalene	4.35E-06	5.90E-06	8.16E-10
Nickel	2.37E-03	2.37E-03	4.07E-07
Phenanthrene	7.01E-04	9.50E-04	1.31E-07
Pyrene	1.38E-03	1.87E-03	2.58E-07
Vanadium	7.47E-04	7.47E-04	1.29E-07
Zinc	1.52E-04	1.48E-01	6.37E-06
LPAH	7.60E-04	1.03E-03	1.42E-07
HPAH	4.36E-03	5.91E-03	8.17E-07
TOTAL PAHs	5.07E-03	6.91E-03	9.52E-07

TABLE D-6
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	4.34E-08
4,4'-DDE	1.50E-09
4,4'-DDT	2.88E-07
Acenaphthene	4.04E-08
Acenaphthylene	4.45E-08
Anthracene	4.41E-08
Antimony	9.14E-06
Aroclor-1254	1.51E-08
Barium	7.19E-04
Benzo(a)anthracene	3.86E-08
Benzo(a)pyrene	1.36E-06
Benzo(b)fluoranthene	9.14E-07
Benzo(g,h,i)perylene	1.29E-06
Benzo(k)fluoranthene	6.04E-08
Boron	5.55E-03
Cadmium	2.03E-06
Chromium	7.84E-05
Chrysene	1.37E-06
Copper	3.65E-03
Dibenz(a,h)anthracene	3.88E-08
Dieldrin	3.21E-08
Endrin	3.90E-08
Endrin Ketone	9.62E-08
Fluoranthene	2.37E-06
Fluorene	3.97E-08
Indeno(1,2,3-cd)pyrene	1.49E-06
Lead	3.29E-04
Lithium	7.13E-03
Manganese	1.06E-01
Mercury	8.54E-08
Molybdenum	8.36E-06
Naphthalene	1.33E-08
Nickel	6.63E-05
Phenanthrene	2.15E-06
Pyrene	4.22E-06
Vanadium	7.90E-05
Zinc	4.08E-03
LPAH	2.33E-06
HPAH	1.33E-05
TOTAL PAHs	1.57E-05

Notes:
* Expressed in dry weight.

TABLE D-7
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table D-1	
IR	Maximum Ingestion rate of soil (kg/day)*	2.71E-07	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	4.00E-03	Davis and Schmidly, 2009

Chemical		Sc	Intake
2-Methylnaphthalene		1.18E-02	7.99E-07
4,4'-DDE		4.27E-04	2.89E-08
4,4'-DDT		8.18E-02	5.54E-06
Acenaphthene		1.10E-02	7.45E-07
Acenaphthylene	surface soil	1.21E-02	8.20E-07
Anthracene		1.20E-02	8.13E-07
Antimony		2.63E+00	1.78E-04
Aroclor-1254		4.30E-03	2.91E-07
Barium		2.08E+02	1.41E-02
Benzo(a)anthracene		1.11E-02	7.52E-07
Benzo(a)pyrene		3.87E-01	2.62E-05
Benzo(b)fluoranthene		2.60E-01	1.76E-05
Benzo(g,h,i)perylene		3.50E-01	2.37E-05
Benzo(k)fluoranthene		1.72E-02	1.17E-06
Boron		1.60E+01	1.08E-03
Cadmium		4.78E-01	3.24E-05
Chromium		2.27E+01	1.54E-03
Chrysene		3.94E-01	2.67E-05
Copper		4.48E+01	3.04E-03
Dibenz(a,h)anthracene		1.09E-02	7.38E-07
Dieldrin	surface soil	1.83E-04	1.24E-08
Endrin	surface soil	2.22E-04	1.50E-08
Endrin Ketone	surface soil	5.48E-04	3.71E-08
Fluoranthene		6.46E-01	4.38E-05
Fluorene		1.08E-02	7.32E-07
Indeno(1,2,3-cd)pyrene		4.06E-01	2.75E-05
Lead		9.54E+01	6.46E-03
Lithium		2.05E+01	1.39E-03
Manganese		5.59E+02	3.79E-02
Mercury		2.46E-02	1.67E-06
Molybdenum		2.42E+00	1.64E-04
Naphthalene		3.63E-03	2.46E-07
Nickel		1.91E+01	1.29E-03
Phenanthrene		5.84E-01	3.96E-05
Pyrene		1.15E+00	7.78E-05
Vanadium		2.29E+01	1.55E-03
Zinc		1.18E+03	8.00E-02
LPAH		6.33E-01	4.29E-05
HPAH		3.63E+00	2.46E-04
TOTAL PAHs		4.26E+00	2.89E-04

TABLE D-7
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

FOOD INGESTION

INTAKE = ((Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ca	Arthropod concentration (mg/kg)	see Table D-15	
Cp	Plant concentration (mg/kg)	see Table D-15	
IR	Maximum Ingestion rate of of food (kg/day)*	3.38E-06	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	9.00E-01	EPA, 1993
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	1.00E-01	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	4.00E-03	Davis and Schmidly, 2009

Chemical	Arthropod	Plant	Intake
2-Methylnaphthalene	8.26E-04	2.38E-04	6.48E-07
4,4'-DDE	5.38E-04	4.00E-06	4.10E-07
4,4'-DDT	1.03E-01	7.66E-04	7.84E-05
Acenaphthene	7.70E-04	2.22E-04	6.04E-07
Acenaphthylene	8.47E-04	2.44E-04	6.65E-07
Anthracene	8.40E-04	2.42E-04	6.59E-07
Antimony	5.79E-01	5.27E-01	4.85E-04
Aroclor-1254	4.86E-03	4.30E-05	3.70E-06
Barium	4.58E+01	3.13E+01	3.75E-02
Benzo(a)anthracene	3.33E-04	2.24E-04	2.72E-07
Benzo(a)pyrene	2.71E-02	3.91E-03	2.09E-05
Benzo(b)fluoranthene	1.82E-02	2.63E-03	1.41E-05
Benzo(g,h,i)perylene	2.45E-02	7.07E-03	1.92E-05
Benzo(k)fluoranthene	1.38E-03	1.74E-04	1.06E-06
Boron	1.60E+01	1.60E+01	1.35E-02
Cadmium	4.59E-01	1.74E-01	3.64E-04
Chromium	2.27E-01	1.70E-01	1.87E-04
Chrysene	1.58E-02	7.37E-03	1.26E-05
Copper	1.79E+00	1.79E+01	2.88E-03
Dibenz(a,h)anthracene	7.63E-04	6.98E-05	5.86E-07
Dieldrin	2.69E-03	6.39E-06	2.05E-06
Endrin	2.22E-04	1.28E-05	1.70E-07
Endrin Ketone	5.48E-04	3.16E-05	4.19E-07
Fluoranthene	4.52E-02	1.30E-02	3.55E-05
Fluorene	7.56E-04	2.18E-04	5.93E-07
Indeno(1,2,3-cd)pyrene	3.25E-02	1.58E-03	2.48E-05
Lead	2.86E+00	4.29E+00	2.54E-03
Lithium	2.05E+01	2.05E+01	1.73E-02
Manganese	3.38E+01	4.43E+01	2.95E-02
Mercury	2.09E-01	3.37E-03	1.59E-04
Molybdenum	2.42E-02	1.82E-02	1.99E-05
Naphthalene	2.54E-04	7.33E-05	1.99E-07
Nickel	3.82E-01	6.11E-01	3.42E-04
Phenanthrene	4.09E-02	1.18E-02	3.21E-05
Pyrene	8.04E-02	2.32E-02	6.31E-05
Vanadium	2.29E-01	1.72E-01	1.88E-04
Zinc	6.61E+02	1.42E-09	5.03E-01
LPAH	4.43E-02	1.28E-02	3.48E-05
HPAH	2.54E-01	7.34E-02	2.00E-04
TOTAL PAHs	2.99E-01	8.53E-02	2.34E-04

TABLE D-7
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.45E-06
4,4'-DDE	4.38E-07
4,4'-DDT	8.40E-05
Acenaphthene	1.35E-06
Acenaphthylene	1.48E-06
Anthracene	1.47E-06
Antimony	6.63E-04
Aroclor-1254	3.99E-06
Barium	5.16E-02
Benzo(a)anthracene	1.02E-06
Benzo(a)pyrene	4.72E-05
Benzo(b)fluoranthene	3.17E-05
Benzo(g,h,i)perylene	4.29E-05
Benzo(k)fluoranthene	2.23E-06
Boron	1.46E-02
Cadmium	3.96E-04
Chromium	1.72E-03
Chrysene	3.93E-05
Copper	5.91E-03
Dibenz(a,h)anthracene	1.32E-06
Dieldrin	2.06E-06
Endrin	1.85E-07
Endrin Ketone	4.57E-07
Fluoranthene	7.93E-05
Fluorene	1.33E-06
Indeno(1,2,3-cd)pyrene	5.23E-05
Lead	9.00E-03
Lithium	1.87E-02
Manganese	6.74E-02
Mercury	1.61E-04
Molybdenum	1.84E-04
Naphthalene	4.45E-07
Nickel	1.64E-03
Phenanthrene	7.17E-05
Pyrene	1.41E-04
Vanadium	1.74E-03
Zinc	5.83E-01
LPAH	7.77E-05
HPAH	4.46E-04
TOTAL PAHs	5.23E-04

Notes:
* Expressed in dry weight.
* Soil ingestion was assumed to be 8% of dietary intake.

TABLE D-8
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Avian Herbivore/Omnivore (AMERICAN ROBIN)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table D-2	
IR	Maximum Ingestion rate of soil (kg/day)*	2.52E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	6.30E-02	EPA, 1993

Chemical		Sc	Intake
2-Methylnaphthalene		1.18E-02	4.72E-07
4,4'-DDE		4.00E-04	1.60E-08
4,4'-DDT		5.00E-04	2.00E-08
Acenaphthene		1.10E-02	4.40E-07
Acenaphthylene		1.21E-02	4.84E-07
Anthracene		1.21E-02	4.84E-07
Antimony		4.95E+00	1.98E-04
Aroclor-1254		4.29E-03	1.72E-07
Barium		2.64E+02	1.06E-02
Benzo(a)anthracene		1.10E-02	4.40E-07
Benzo(a)pyrene		1.16E-02	4.64E-07
Benzo(b)fluoranthene		3.73E-01	1.49E-05
Benzo(g,h,i)perylene		5.92E-01	2.37E-05
Benzo(k)fluoranthene		1.75E-02	7.00E-07
Boron		2.21E+01	8.82E-04
Cadmium		5.72E-01	2.29E-05
Chromium		4.86E+01	1.94E-03
Chrysene		1.03E-02	4.12E-07
Copper		7.00E+01	2.80E-03
Dibenz(a,h)anthracene		1.10E-02	4.40E-07
Dieldrin		1.83E-04	7.32E-09
Endrin		2.22E-04	8.88E-09
Endrin Ketone		5.48E-04	2.19E-08
Fluoranthene		1.28E-02	5.12E-07
Fluorene		1.09E-02	4.36E-07
Indeno(1,2,3-cd)pyrene		6.82E-01	2.73E-05
Lead		2.21E+02	8.85E-03
Lithium		1.87E+01	7.47E-04
Manganese		7.34E+02	2.94E-02
Mercury		3.75E-02	1.50E-06
Molybdenum		4.71E+00	1.88E-04
Naphthalene	all soil data (not a COPEC in surface soil)	3.63E-03	1.45E-07
Nickel		2.08E+01	8.30E-04
Phenanthrene		1.42E-02	5.68E-07
Pyrene		2.03E+00	8.13E-05
Vanadium		2.34E+01	9.36E-04
Zinc		2.34E+03	9.37E-02
LPAH		7.21E-02	2.88E-06
HPAH		3.75E+00	1.50E-04
TOTAL PAHs		3.83E+00	1.53E-04

TABLE D-8
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Avian Herbivore/Omnivore (AMERICAN ROBIN)

FOOD INGESTION

INTAKE = ((Ce * IR * Dfe * AUF)/(BW) + (Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ce	Earthworm concentration (mg/kg)	see Table D-15	
Ca	Arthropod concentration (mg/kg)	see Table D-15	
Cp	Plant concentration (mg/kg)	see Table D-15	
IR	Maximum Ingestion rate of of food (kg/day)*	4.85E-05	EPA, 1993
Dfe	Dietary fraction of earthworms (unitless)	4.60E-01	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	4.60E-01	EPA, 1993
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	8.00E-02	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	6.30E-02	EPA, 1993

Chemical	Earthworm	Arthropod	Plant	Intake
2-Methylnaphthalene	8.26E-04	8.26E-04	2.38E-04	6.00E-07
4,4'-DDE	5.38E-04	5.38E-04	4.00E-06	3.81E-07
4,4'-DDT	1.03E-01	1.03E-01	7.66E-04	7.30E-05
Acenaphthene	7.70E-04	7.70E-04	2.22E-04	5.59E-07
Acenaphthylene	8.47E-04	8.47E-04	2.44E-04	6.15E-07
Anthracene	8.40E-04	8.40E-04	2.42E-04	6.10E-07
Antimony	5.79E-01	5.79E-01	5.27E-01	4.43E-04
Aroclor-1254	4.86E-03	4.86E-03	4.30E-05	3.44E-06
Barium	4.58E+01	4.58E+01	3.13E+01	3.44E-02
Benzo(a)anthracene	3.33E-04	3.33E-04	2.24E-04	2.50E-07
Benzo(a)pyrene	2.71E-02	2.71E-02	3.91E-03	1.94E-05
Benzo(b)fluoranthene	1.82E-02	1.82E-02	2.63E-03	1.31E-05
Benzo(g,h,i)perylene	2.45E-02	2.45E-02	7.07E-03	1.78E-05
Benzo(k)fluoranthene	1.38E-03	1.38E-03	1.74E-04	9.85E-07
Boron	1.60E+01	1.60E+01	1.60E+01	1.23E-02
Cadmium	4.59E-01	4.59E-01	1.74E-01	3.36E-04
Chromium	2.27E-01	2.27E-01	1.70E-01	1.71E-04
Chrysene	1.58E-02	1.58E-02	7.37E-03	1.16E-05
Copper	1.79E+00	1.79E+00	1.79E+01	2.37E-03
Dibenz(a,h)anthracene	7.63E-04	7.63E-04	6.98E-05	5.45E-07
Dieldrin	2.69E-03	2.69E-03	6.39E-06	1.91E-06
Endrin	2.22E-04	2.22E-04	1.28E-05	1.58E-07
Endrin Ketone	5.48E-04	5.48E-04	3.16E-05	3.90E-07
Fluoranthene	4.52E-02	4.52E-02	1.30E-02	3.28E-05
Fluorene	7.56E-04	7.56E-04	2.18E-04	5.49E-07
Indeno(1,2,3-cd)pyrene	3.25E-02	3.25E-02	1.58E-03	2.31E-05
Lead	2.86E+00	2.86E+00	4.29E+00	2.29E-03
Lithium	2.05E+01	2.05E+01	2.05E+01	1.58E-02
Manganese	3.38E+01	3.38E+01	4.43E+01	2.67E-02
Mercury	2.09E-01	2.09E-01	3.37E-03	1.48E-04
Molybdenum	2.42E-02	2.42E-02	1.82E-02	1.83E-05
Naphthalene	2.54E-04	2.54E-04	7.33E-05	1.84E-07
Nickel	3.82E-01	3.82E-01	6.11E-01	3.08E-04
Phenanthrene	4.09E-02	4.09E-02	1.18E-02	2.97E-05
Pyrene	8.04E-02	8.04E-02	2.32E-02	5.84E-05
Vanadium	2.29E-01	2.29E-01	1.72E-01	1.73E-04
Zinc	6.61E+02	6.61E+02	1.42E-09	4.68E-01
LPAH	4.43E-02	4.43E-02	1.28E-02	3.22E-05
HPAH	2.54E-01	2.54E-01	7.34E-02	1.85E-04
TOTAL PAHs	2.99E-01	2.99E-01	8.53E-02	2.17E-04

TABLE D-8
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Avian Herbivore/Omnivore (AMERICAN ROBIN)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.07E-06
4,4'-DDE	3.97E-07
4,4'-DDT	7.31E-05
Acenaphthene	9.99E-07
Acenaphthylene	1.10E-06
Anthracene	1.09E-06
Antimony	6.41E-04
Aroclor-1254	3.62E-06
Barium	4.50E-02
Benzo(a)anthracene	6.90E-07
Benzo(a)pyrene	1.99E-05
Benzo(b)fluoranthene	2.80E-05
Benzo(g,h,i)perylene	4.15E-05
Benzo(k)fluoranthene	1.69E-06
Boron	1.32E-02
Cadmium	3.59E-04
Chromium	2.11E-03
Chrysene	1.20E-05
Copper	5.17E-03
Dibenz(a,h)anthracene	9.85E-07
Dieldrin	1.91E-06
Endrin	1.67E-07
Endrin Ketone	4.12E-07
Fluoranthene	3.33E-05
Fluorene	9.85E-07
Indeno(1,2,3-cd)pyrene	5.04E-05
Lead	1.11E-02
Lithium	1.65E-02
Manganese	5.61E-02
Mercury	1.50E-04
Molybdenum	2.07E-04
Naphthalene	3.30E-07
Nickel	1.14E-03
Phenanthrene	3.02E-05
Pyrene	1.40E-04
Vanadium	1.11E-03
Zinc	5.62E-01
LPAH	3.51E-05
HPAH	3.35E-04
TOTAL PAHs	3.70E-04

Notes:
* Expressed in dry weight.

TABLE D-9
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table D-2	
IR	Maximum Ingestion rate of soil (kg/day)*	8.97E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	9.57E-01	EPA, 1993

Chemical		Sc	Intake
2-Methylnaphthalene		1.18E-02	1.11E-07
4,4'-DDE		4.00E-04	3.75E-09
4,4'-DDT		5.00E-04	4.69E-09
Acenaphthene		1.10E-02	1.03E-07
Acenaphthylene		1.21E-02	1.13E-07
Anthracene		1.21E-02	1.13E-07
Antimony		4.95E+00	4.64E-05
Aroclor-1254		4.29E-03	4.02E-08
Barium		2.64E+02	2.48E-03
Benzo(a)anthracene		1.10E-02	1.03E-07
Benzo(a)pyrene		1.16E-02	1.09E-07
Benzo(b)fluoranthene		3.73E-01	3.50E-06
Benzo(g,h,i)perylene		5.92E-01	5.55E-06
Benzo(k)fluoranthene		1.75E-02	1.64E-07
Boron		2.21E+01	2.07E-04
Cadmium		5.72E-01	5.36E-06
Chromium		4.86E+01	4.55E-04
Chrysene		1.03E-02	9.65E-08
Copper		7.00E+01	6.56E-04
Dibenz(a,h)anthracene		1.10E-02	1.03E-07
Dieldrin		1.83E-04	1.72E-09
Endrin		2.22E-04	2.08E-09
Endrin Ketone		5.48E-04	5.14E-09
Fluoranthene		1.28E-02	1.20E-07
Fluorene		1.09E-02	1.02E-07
Indeno(1,2,3-cd)pyrene		6.82E-01	6.39E-06
Lead		2.21E+02	2.07E-03
Lithium		1.87E+01	1.75E-04
Manganese		7.34E+02	6.88E-03
Mercury		3.75E-02	3.51E-07
Molybdenum		4.71E+00	4.41E-05
Naphthalene	all soil data (not a COPEC in surface soil)	3.63E-03	3.40E-08
Nickel		2.08E+01	1.95E-04
Phenanthrene		1.42E-02	1.33E-07
Pyrene		2.03E+00	1.91E-05
Vanadium		2.34E+01	2.19E-04
Zinc		2.34E+03	2.20E-02
LPAH		6.33E-01	5.94E-06
HPAH		3.63E+00	3.40E-05
TOTAL PAHs		4.26E+00	4.00E-05

TABLE D-9
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

FOOD INGESTION

INTAKE = ((Cm * IR * Dfm * AUF)/(BW) + (Cb * IR * DFb * AUF) / (BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cm	Mammal concentration (mg/kg)	see Table D-15	
Cb	Bird concentration (mg/kg)	see Table D-15	
IR	Maximum Ingestion rate of of food (kg/day)*	4.48E-04	EPA, 1993
Dfm	Dietary fraction of small mammals (unitless)	7.85E-01	EPA, 1993
Dfb	Dietary fraction of birds (unitless)	1.00E+00	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	9.57E-01	EPA, 1993

Chemical	Mammal	Bird	Intake
2-Methylnaphthalene	1.42E-05	1.92E-05	1.42E-08
4,4'-DDE	1.37E-07	2.81E-07	1.82E-10
4,4'-DDT	2.62E-05	5.39E-05	3.49E-08
Acenaphthene	1.32E-05	1.79E-05	1.32E-08
Acenaphthylene	1.45E-05	1.97E-05	1.45E-08
Anthracene	1.44E-05	1.95E-05	1.44E-08
Antimony	3.19E-04	3.19E-04	2.67E-07
Aroclor-1254	1.30E-06	2.57E-06	1.68E-09
Barium	2.86E-03	2.86E-03	2.39E-06
Benzo(a)anthracene	1.80E-06	2.44E-06	1.81E-09
Benzo(a)pyrene	9.82E-05	1.94E-04	1.27E-07
Benzo(b)fluoranthene	7.80E-05	1.54E-04	1.01E-07
Benzo(g,h,i)perylene	4.20E-04	5.69E-04	4.21E-07
Benzo(k)fluoranthene	5.14E-06	1.01E-05	6.63E-09
Boron	3.19E+01	3.19E+01	2.67E-02
Cadmium	1.26E-05	8.92E-03	4.18E-06
Chromium	7.41E-04	7.41E-04	6.20E-07
Chrysene	6.88E-05	9.67E-05	7.06E-08
Copper	2.03E+01	2.03E+01	1.69E-02
Dibenz(a,h)anthracene	5.09E-06	1.30E-05	7.98E-09
Dieldrin	1.83E-04	1.83E-04	1.53E-07
Endrin	2.22E-04	2.22E-04	1.86E-07
Endrin Ketone	5.48E-04	5.48E-04	4.58E-07
Fluoranthene	7.75E-04	1.05E-03	7.77E-07
Fluorene	1.30E-05	1.76E-05	1.30E-08
Indeno(1,2,3-cd)pyrene	3.17E-04	1.06E-03	6.11E-07
Lead	8.14E-04	8.14E-04	6.80E-07
Lithium	4.10E+01	4.10E+01	3.43E-02
Manganese	6.04E+02	6.04E+02	5.04E-01
Mercury	1.60E-06	6.62E-06	3.69E-09
Molybdenum	7.90E-05	7.90E-05	6.60E-08
Naphthalene	4.35E-06	5.90E-06	4.36E-09
Nickel	2.37E-03	2.37E-03	1.98E-06
Phenanthrene	7.01E-04	9.50E-04	7.02E-07
Pyrene	1.38E-03	1.87E-03	1.38E-06
Vanadium	7.47E-04	7.47E-04	6.24E-07
Zinc	1.52E-04	1.48E-01	6.92E-05
LPAH	7.60E-04	1.03E-03	7.61E-07
HPAH	4.36E-03	5.91E-03	4.37E-06
TOTAL PAHs	5.07E-03	6.91E-03	5.10E-06

TABLE D-9
INTAKE CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.25E-07
4,4'-DDE	3.93E-09
4,4'-DDT	3.95E-08
Acenaphthene	1.16E-07
Acenaphthylene	1.28E-07
Anthracene	1.28E-07
Antimony	4.67E-05
Aroclor-1254	4.19E-08
Barium	2.48E-03
Benzo(a)anthracene	1.05E-07
Benzo(a)pyrene	2.36E-07
Benzo(b)fluoranthene	3.60E-06
Benzo(g,h,i)perylene	5.97E-06
Benzo(k)fluoranthene	1.71E-07
Boron	2.69E-02
Cadmium	9.54E-06
Chromium	4.56E-04
Chrysene	1.67E-07
Copper	1.76E-02
Dibenz(a,h)anthracene	1.11E-07
Dieldrin	1.55E-07
Endrin	1.88E-07
Endrin Ketone	4.63E-07
Fluoranthene	8.97E-07
Fluorene	1.15E-07
Indeno(1,2,3-cd)pyrene	7.00E-06
Lead	2.07E-03
Lithium	3.44E-02
Manganese	5.11E-01
Mercury	3.55E-07
Molybdenum	4.42E-05
Naphthalene	3.84E-08
Nickel	1.97E-04
Phenanthrene	8.35E-07
Pyrene	2.04E-05
Vanadium	2.20E-04
Zinc	2.20E-02
LPAH	6.70E-06
HPAH	3.84E-05
TOTAL PAHs	4.51E-05

Notes:
* Expressed in dry weight.

TABLE D-10
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Herbivore (DEER MOUSE)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table D-3

Chemical	Intake	TRV (deer mouse)		EHQ
2-Methylnaphthalene	1.48E-06			
4,4'-DDE	2.87E-07	1.47E-01	<	1.95E-06
4,4'-DDT	5.49E-05	1.47E-01		3.74E-04
Acenaphthene	1.38E-06			
Acenaphthylene	1.52E-06			
Anthracene	1.51E-06			
Antimony	2.66E-03	1.25E-01		2.12E-02
Aroclor-1254	2.62E-06	1.55E-01	<	1.69E-05
Barium	1.63E-01	5.18E+01		3.15E-03
Benzo(a)anthracene	1.17E-06			
Benzo(a)pyrene	3.11E-05			
Benzo(b)fluoranthene	2.09E-05			
Benzo(g,h,i)perylene	4.40E-05			
Benzo(k)fluoranthene	1.47E-06			
Boron	7.96E-02	3.40E+01		2.34E-03
Cadmium	1.01E-03	7.70E-01		1.31E-03
Chromium	8.79E-04	2.40E+00		3.66E-04
Chrysene	4.10E-05			
Copper	8.15E-02	5.60E+00		1.45E-02
Dibenz(a,h)anthracene	6.95E-07			
Dieldrin	1.37E-06	1.50E-02		9.15E-05
Endrin	1.68E-07	9.20E-02		1.83E-06
Endrin Ketone	4.15E-07	9.20E-02		4.52E-06
Fluoranthene	8.12E-05			
Fluorene	1.36E-06			
Indeno(1,2,3-cd)pyrene	2.33E-05			
Lead	2.07E-02	4.70E+00		4.41E-03
Lithium	1.02E-01	1.10E+01		9.31E-03
Manganese	2.16E-01	1.06E+02		2.04E-03
Mercury	1.20E-04	1.01E+00		1.18E-04
Molybdenum	9.37E-05	2.70E-01		3.47E-04
Naphthalene	4.56E-07			
Nickel	2.94E-03	1.70E+00		1.73E-03
Phenanthrene	7.34E-05			
Pyrene	1.44E-04			
Vanadium	8.85E-04	4.16E+00		2.13E-04
Zinc	3.30E-01	7.54E+01		4.38E-03
LPAH	7.96E-05	6.56E+01		1.21E-06
HPAH	4.57E-04	6.15E-01		7.42E-04
TOTAL PAHs	5.32E-04			

TABLE D-11
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Mammalian Carnivore (COYOTE)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table D-3

Chemical	Intake	TRV Coyote		EHQ
2-Methylnaphthalene	4.34E-08			
4,4'-DDE	1.50E-09	1.47E-01	<	1.02E-08
4,4'-DDT	2.88E-07	1.47E-01		1.96E-06
Acenaphthene	4.04E-08			
Acenaphthylene	4.45E-08			
Anthracene	4.41E-08			
Antimony	9.14E-06	1.25E-01		7.31E-05
Aroclor-1254	1.51E-08	1.55E-01	<	9.75E-08
Barium	7.19E-04	5.18E+01		1.39E-05
Benzo(a)anthracene	3.86E-08			
Benzo(a)pyrene	1.36E-06			
Benzo(b)fluoranthene	9.14E-07			
Benzo(g,h,i)perylene	1.29E-06			
Benzo(k)fluoranthene	6.04E-08			
Boron	5.55E-03	2.20E+01		2.52E-04
Cadmium	2.03E-06	7.70E-01		2.64E-06
Chromium	7.84E-05	2.40E+00		3.27E-05
Chrysene	1.37E-06			
Copper	3.65E-03	5.60E+00		6.51E-04
Dibenz(a,h)anthracene	3.88E-08			
Dieldrin	3.21E-08	1.50E-02		2.14E-06
Endrin	3.90E-08	9.20E-02		4.24E-07
Endrin Ketone	9.62E-08	9.20E-02		1.05E-06
Fluoranthene	2.37E-06			
Fluorene	3.97E-08			
Indeno(1,2,3-cd)pyrene	1.49E-06			
Lead	3.29E-04	4.70E+00		7.01E-05
Lithium	7.13E-03	7.50E+00		9.51E-04
Manganese	1.06E-01	7.00E+01		1.51E-03
Mercury	8.54E-08	1.01E+00		8.45E-08
Molybdenum	8.36E-06	1.80E-01		4.65E-05
Naphthalene	1.33E-08			
Nickel	6.63E-05	1.70E+00		3.90E-05
Phenanthrene	2.15E-06			
Pyrene	4.22E-06			
Vanadium	7.90E-05	4.16E+00		1.90E-05
Zinc	4.08E-03	7.54E+01		5.41E-05
LPAH	2.33E-06	6.56E+01		3.55E-08
HPAH	1.33E-05	6.15E-01		2.17E-05
TOTAL PAHs	1.57E-05			

TABLE D-12
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL NORTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table D-3

Chemical	Intake	TRV Least Shrew		EHQ
2-Methylnaphthalene	1.45E-06			
4,4'-DDE	4.38E-07	1.47E-01	<	2.98E-06
4,4'-DDT	8.40E-05	1.47E-01		5.71E-04
Acenaphthene	1.35E-06			
Acenaphthylene	1.48E-06			
Anthracene	1.47E-06			
Antimony	6.63E-04	1.25E-01		5.31E-03
Aroclor-1254	3.99E-06	1.55E-01	<	2.57E-05
Barium	5.16E-02	5.18E+01		9.97E-04
Benzo(a)anthracene	1.02E-06			
Benzo(a)pyrene	4.72E-05			
Benzo(b)fluoranthene	3.17E-05			
Benzo(g,h,i)perylene	4.29E-05			
Benzo(k)fluoranthene	2.23E-06			
Boron	1.46E-02	3.70E+01		3.93E-04
Cadmium	3.96E-04	7.70E-01		5.14E-04
Chromium	1.72E-03	2.40E+00		7.19E-04
Chrysene	3.93E-05			
Copper	5.91E-03	5.60E+00		1.06E-03
Dibenz(a,h)anthracene	1.32E-06			
Dieldrin	2.06E-06	1.50E-02		1.37E-04
Endrin	1.85E-07	9.20E-02		2.01E-06
Endrin Ketone	4.57E-07	9.20E-02		4.96E-06
Fluoranthene	7.93E-05			
Fluorene	1.33E-06			
Indeno(1,2,3-cd)pyrene	5.23E-05			
Lead	9.00E-03	4.70E+00		1.92E-03
Lithium	1.87E-02	1.20E+01		1.56E-03
Manganese	6.74E-02	1.15E+02		5.86E-04
Mercury	1.61E-04	1.01E+00		1.59E-04
Molybdenum	1.84E-04	2.90E-01		6.34E-04
Naphthalene	4.45E-07			
Nickel	1.64E-03	1.70E+00		9.62E-04
Phenanthrene	7.17E-05			
Pyrene	1.41E-04			
Vanadium	1.74E-03	4.16E+00		4.18E-04
Zinc	5.83E-01	7.54E+01		7.73E-03
LPAH	7.77E-05	6.56E+01		1.18E-06
HPAH	4.46E-04	6.15E-01		7.24E-04
TOTAL PAHs	5.23E-04			

TABLE D-13
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL NORTH OF MARLIN
Avian Herbivore/Omnivore (AMERICAN ROBIN)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table D-3

Chemical	Intake	TRV American Robin		EHQ
2-Methylnaphthalene	1.07E-06			
4,4'-DDE	3.97E-07	2.27E-01	<	1.75E-06
4,4'-DDT	7.31E-05	2.27E-01	<	3.22E-04
Acenaphthene	9.99E-07			
Acenaphthylene	1.10E-06			
Anthracene	1.09E-06			
Antimony	6.41E-04			
Aroclor-1254	3.62E-06	1.80E-01	<	2.01E-05
Barium	4.50E-02	1.91E+01		2.35E-03
Benzo(a)anthracene	6.90E-07			
Benzo(a)pyrene	1.99E-05			
Benzo(b)fluoranthene	2.80E-05			
Benzo(g,h,i)perylene	4.15E-05			
Benzo(k)fluoranthene	1.69E-06			
Boron	1.32E-02	1.74E+01		7.56E-04
Cadmium	3.59E-04	1.47E+00		2.44E-04
Chromium	2.11E-03	2.66E+00		7.95E-04
Chrysene	1.20E-05			
Copper	5.17E-03	4.05E+00		1.28E-03
Dibenz(a,h)anthracene	9.85E-07			
Dieldrin	1.91E-06	7.09E-02	<	2.70E-05
Endrin	1.67E-07	1.00E-02	<	1.67E-05
Endrin Ketone	4.12E-07	1.00E-02	<	4.12E-05
Fluoranthene	3.33E-05			
Fluorene	9.85E-07			
Indeno(1,2,3-cd)pyrene	5.04E-05			
Lead	1.11E-02	1.63E+00		6.83E-03
Lithium	1.65E-02			
Manganese	5.61E-02	9.98E+02		5.62E-05
Mercury	1.50E-04	3.25E+00		4.61E-05
Molybdenum	2.07E-04	1.90E+00		1.09E-04
Naphthalene	3.30E-07			
Nickel	1.14E-03	6.71E+00		1.70E-04
Phenanthrene	3.02E-05			
Pyrene	1.40E-04			
Vanadium	1.11E-03	3.44E-01		3.22E-03
Zinc	5.62E-01	6.61E+01		8.50E-03
LPAH	3.51E-05			
HPAH	3.35E-04			
TOTAL PAHs	3.70E-04			

TABLE D-14
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SOIL NORTH OF MARLIN
Large Avian Carnivore (RED-TAILED HAWK)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table D-3

Chemical	**Intake**	**TRV Red-Tailed Hawk**		**EHQ**
2-Methylnaphthalene	1.25E-07			
4,4'-DDE	3.93E-09	2.27E-01	<	1.73E-08
4,4'-DDT	3.95E-08	2.27E-01	<	1.74E-07
Acenaphthene	1.16E-07			
Acenaphthylene	1.28E-07			
Anthracene	1.28E-07			
Antimony	4.67E-05			
Aroclor-1254	4.19E-08	1.80E-01	<	2.33E-07
Barium	2.48E-03	3.15E+01		7.87E-05
Benzo(a)anthracene	1.05E-07			
Benzo(a)pyrene	2.36E-07			
Benzo(b)fluoranthene	3.60E-06			
Benzo(g,h,i)perylene	5.97E-06			
Benzo(k)fluoranthene	1.71E-07			
Boron	2.69E-02	2.86E+01		9.39E-04
Cadmium	9.54E-06	1.47E+00		6.49E-06
Chromium	4.56E-04	2.66E+00		1.71E-04
Chrysene	1.67E-07			
Copper	1.76E-02	4.05E+00		4.35E-03
Dibenz(a,h)anthracene	1.11E-07			
Dieldrin	1.55E-07	7.09E-02	<	2.18E-06
Endrin	1.88E-07	1.00E-02	<	1.88E-05
Endrin Ketone	4.63E-07	1.00E-02	<	4.63E-05
Fluoranthene	8.97E-07			
Fluorene	1.15E-07			
Indeno(1,2,3-cd)pyrene	7.00E-06			
Lead	2.07E-03	1.63E+00		1.27E-03
Lithium	3.44E-02			
Manganese	5.11E-01	1.64E+03		3.12E-04
Mercury	3.55E-07	3.25E+00		1.09E-07
Molybdenum	4.42E-05	3.30E+00		1.34E-05
Naphthalene	3.84E-08			
Nickel	1.97E-04	6.71E+00		2.93E-05
Phenanthrene	8.35E-07			
Pyrene	2.04E-05			
Vanadium	2.20E-04	3.44E-01		6.39E-04
Zinc	2.20E-02	6.61E+01		3.33E-04
LPAH	6.70E-06			
HPAH	3.84E-05			
TOTAL PAHs	4.51E-05			

TABLE D-15
CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg)

Cfood = Csoil x BCF (or BAF)

where:

Cfood = Chemical Concentration in food (mg/kg dry)
Csoil = Chemical Concentration in soil (mg/kg dry)
BCF Bioconcentration Factor (unitless)
BAF = Bioaccumulation Factor (unitless)

Compound	Csoil (mg/kg)	Soil to Earthworm BCF	Earthworm Concentration	Reference	Soil to Arthropod BCF	Arthropod Concentration	Reference	Soil to Plant BAF	Plant/Fruit/Seed Concentration	Reference	Plant to Wildlife BCF	Plant to Deer Mouse Concentration	Reference
2-Methylnaphthalene	1.18E-02	7.00E-02	8.26E-04	EPA, 1999*	7.00E-02	8.26E-04	EPA, 1999*	2.02E-02	2.38E-04	EPA, 1999*	5.31E-02	1.27E-05	EPA, 1999*
4,4'-DDE	4.27E-04	1.26E+00	5.38E-04	EPA, 1999	1.26E+00	5.38E-04	EPA, 1999	9.37E-03	4.00E-06	EPA, 1999	2.72E-02	1.09E-07	EPA, 1999
4,4'-DDT	8.18E-02	1.26E+00	1.03E-01	EPA, 1999	1.26E+00	1.03E-01	EPA, 1999	9.37E-03	7.66E-04	EPA, 1999	2.72E-02	2.08E-05	EPA, 1999
Acenaphthene	1.10E-02	7.00E-02	7.70E-04	EPA, 1999*	7.00E-02	7.70E-04	EPA, 1999*	2.02E-02	2.22E-04	EPA, 1999*	5.31E-02	1.18E-05	EPA, 1999*
Acenaphthylene+	1.21E-02	7.00E-02	8.47E-04	EPA, 1999*	7.00E-02	8.47E-04	EPA, 1999*	2.02E-02	2.44E-04	EPA, 1999*	5.31E-02	1.30E-05	EPA, 1999*
Anthracene	1.20E-02	7.00E-02	8.40E-04	EPA, 1999*	7.00E-02	8.40E-04	EPA, 1999*	2.02E-02	2.42E-04	EPA, 1999*	5.31E-02	1.29E-05	EPA, 1999*
Antimony	2.63E+00	2.20E-01	5.79E-01	Sample, 199	2.20E-01	5.79E-01	Sample, 199	2.00E-01	5.27E-01	Bechtel, 199	5.99E-04	3.15E-04	EPA, 1999
Aroclor-1254	4.30E-03	1.13E+00	4.86E-03	EPA, 1999	1.13E+00	4.86E-03	EPA, 1999	1.00E-02	4.30E-05	EPA, 1999	2.43E-02	1.04E-06	EPA, 1999
Barium	2.08E+02	2.20E-01	4.58E+01	Sample, 199	2.20E-01	4.58E+01	Sample, 199	1.50E-01	3.13E+01	Bechtel, 199	8.99E-05	2.81E-03	EPA, 1999
Benzo(a)anthracene	1.11E-02	3.00E-02	3.33E-04	EPA, 1999	3.00E-02	3.33E-04	EPA, 1999	2.02E-02	2.24E-04	EPA, 1999	7.19E-03	1.61E-06	EPA, 1999
Benzo(a)pyrene	3.87E-01	7.00E-02	2.71E-02	EPA, 1999	7.00E-02	2.71E-02	EPA, 1999	1.01E-02	3.91E-03	EPA, 1999	2.03E-02	7.93E-05	EPA, 1999
Benzo(b)fluoranthene	2.60E-01	7.00E-02	1.82E-02	EPA, 1999	7.00E-02	1.82E-02	EPA, 1999	1.01E-02	2.63E-03	EPA, 1999	2.40E-02	6.30E-05	EPA, 1999
Benzo(g,h,i)perylene	3.50E-01	7.00E-02	2.45E-02	EPA, 1999*	7.00E-02	2.45E-02	EPA, 1999*	2.02E-02	7.07E-03	EPA, 1999*	5.31E-02	3.75E-04	EPA, 1999*
Benzo(k)fluoranthene	1.72E-02	8.00E-02	1.38E-03	EPA, 1999	8.00E-02	1.38E-03	EPA, 1999	1.01E-02	1.74E-04	EPA, 1999	2.39E-02	4.15E-06	EPA, 1999
Boron	1.60E+01	1.00E+00	1.60E+01	**	1.00E+00	1.60E+01	**	1.00E+00	1.60E+01	**	1.00E+00	1.60E+01	**
Cadmium	4.78E-01	9.60E-01	4.59E-01	Sample, 199	9.60E-01	4.59E-01	Sample, 199	3.64E-01	1.74E-01	Bechtel, 199	7.19E-05	1.25E-05	EPA, 1999
Chromium	2.27E+01	1.00E-02	2.27E-01	Sample, 199	1.00E-02	2.27E-01	Sample, 199	7.50E-03	1.70E-01	Bechtel, 199	3.30E-03	5.62E-04	EPA, 1999
Chrysene	3.94E-01	4.00E-02	1.58E-02	EPA, 1999	4.00E-02	1.58E-02	EPA, 1999	1.87E-02	7.37E-03	EPA, 1999	8.27E-03	6.09E-05	EPA, 1999
Copper	4.48E+01	4.00E-02	1.79E+00	EPA, 1999	4.00E-02	1.79E+00	EPA, 1999	4.00E-01	1.79E+01	EPA, 1999	1.00E+00	1.79E+01	**
Dibenz(a,h)anthracene	1.09E-02	7.00E-02	7.63E-04	EPA, 1999	7.00E-02	7.63E-04	EPA, 1999	6.40E-03	6.98E-05	EPA, 1999	5.31E-02	3.70E-06	EPA, 1999
Dieldrin+	1.83E-04	1.47E+01	2.69E-03	EPA, 2005f	1.47E+01	2.69E-03	EPA, 2005f	3.49E-02	6.39E-06	EPA, 1998	5.65E-03	3.61E-08	EPA, 1998
Endrin+	2.22E-04	1.00E+00	2.22E-04	**	1.00E+00	2.22E-04	**	5.76E-02	1.28E-05	EPA, 1998	2.37E-03	3.03E-08	EPA, 1998
Endrin ketone+	5.48E-04	1.00E+00	5.48E-04	**	1.00E+00	5.48E-04	**	5.76E-02	3.16E-05	EPA, 1998	2.37E-03	7.48E-08	EPA, 1998
Fluoranthene	6.46E-01	7.00E-02	4.52E-02	EPA, 1999*	7.00E-02	4.52E-02	EPA, 1999*	2.02E-02	1.30E-02	EPA, 1999*	5.31E-02	6.93E-04	EPA, 1999*
Fluorene	1.08E-02	7.00E-02	7.56E-04	EPA, 1999*	7.00E-02	7.56E-04	EPA, 1999*	2.02E-02	2.18E-04	EPA, 1999*	5.31E-02	1.16E-05	EPA, 1999*
Indeno(1,2,3-cd)pyrene	4.06E-01	8.00E-02	3.25E-02	EPA, 1999	8.00E-02	3.25E-02	EPA, 1999	3.90E-03	1.58E-03	EPA, 1999	1.24E-01	1.96E-04	EPA, 1999
Lead	9.54E+01	3.00E-02	2.86E+00	EPA, 1999	3.00E-02	2.86E+00	EPA, 1999	4.50E-02	4.29E+00	EPA, 1999	1.80E-04	7.73E-04	EPA, 1999
Lithium	2.05E+01	1.00E+00	2.05E+01	**	1.00E+00	2.05E+01	**	1.00E+00	2.05E+01	**	1.00E+00	2.05E+01	**
Manganese	5.59E+02	6.05E-02	3.38E+01	Sample, 199	6.05E-02	3.38E+01	Sample, 199	7.92E-02	4.43E+01	Bechtel, 199	1.00E+00	4.43E+01	**
Mercury	2.46E-02	8.50E+00	2.09E-01	Sample, 199	8.50E+00	2.09E-01	Sample, 199	1.37E-01	3.37E-03	Bechtel, 199	4.68E-04	1.58E-06	EPA, 1999
Molybdenum	2.42E+00	1.00E-02	2.42E-02	Sample, 199	1.00E-02	2.42E-02	Sample, 199	7.50E-03	1.82E-02	Bechtel, 199	3.30E-03	5.99E-05	EPA, 1999
Naphthalene	3.63E-03	7.00E-02	2.54E-04	EPA, 1999*	7.00E-02	2.54E-04	EPA, 1999*	2.02E-02	7.33E-05	EPA, 1999*	5.31E-02	3.89E-06	EPA, 1999*
Nickel	1.91E+01	2.00E-02	3.82E-01	EPA, 1999	2.00E-02	3.82E-01	EPA, 1999	3.20E-02	6.11E-01	EPA, 1999	3.60E-03	2.20E-03	EPA, 1999
Phenanthrene	5.84E-01	7.00E-02	4.09E-02	EPA, 1999*	7.00E-02	4.09E-02	EPA, 1999*	2.02E-02	1.18E-02	EPA, 1999*	5.31E-02	6.26E-04	EPA, 1999*
Pyrene	1.15E+00	7.00E-02	8.04E-02	EPA, 1999*	7.00E-02	8.04E-02	EPA, 1999*	2.02E-02	2.32E-02	EPA, 1999*	5.31E-02	1.23E-03	EPA, 1999*
Vanadium	2.29E+01	1.00E-02	2.29E-01	Sample, 199	1.00E-02	2.29E-01	Sample, 199	7.50E-03	1.72E-01	Bechtel, 199	3.30E-03	5.66E-04	EPA, 1999
Zinc	1.18E+03	5.60E-01	6.61E+02	EPA, 1999	5.60E-01	6.61E+02	EPA, 1999	1.20E-12	1.42E-09	EPA, 1999	5.39E-05	7.64E-14	EPA, 1999
LPAH	6.33E-01	7.00E-02	4.43E-02	EPA, 1999*	7.00E-02	4.43E-02	EPA, 1999*	2.02E-02	1.28E-02	EPA, 1999*	5.31E-02	6.79E-04	EPA, 1999*
HPAH	3.63E+00	7.00E-02	2.54E-01	EPA, 1999*	7.00E-02	2.54E-01	EPA, 1999*	2.02E-02	7.34E-02	EPA, 1999*	5.31E-02	3.89E-03	EPA, 1999*
TOTAL PAHs	4.26E+00	7.00E-02	2.99E-01	EPA, 1999*	7.00E-02	2.99E-01	EPA, 1999*	2.00E-02	8.53E-02	EPA, 1999*	5.31E-02	4.53E-03	EPA, 1999*

Compound	Soil to Wildlife BCF	Soil to Deer Mouse Concentration	Reference	TOTAL DEER MOUSE CONCENTRATION	Plant to Bird BCF	Plant to Bird Concentration	Reference	Soil to Bird BCF	Soil to Bird Concentration	Reference	TOTAL BIRD CONCENTRATION
2-Methylnaphthalene	1.27E-04	1.50E-06	EPA, 1999*	1.42E-05	3.11E-02	7.41E-06	EPA, 1999*	9.98E-04	1.18E-05	EPA, 1999*	1.92E-05
4,4'-DDE	6.52E-05	2.78E-08	EPA, 1999	1.37E-07	1.59E-02	6.36E-08	EPA, 1999	5.10E-04	2.18E-07	EPA, 1999	2.81E-07
4,4'-DDT	6.52E-05	5.33E-06	EPA, 1999	2.62E-05	1.59E-02	1.22E-05	EPA, 1999	5.10E-04	4.17E-05	EPA, 1999	5.39E-05
Acenaphthene	1.27E-04	1.40E-06	EPA, 1999*	1.32E-05	3.11E-02	6.91E-06	EPA, 1999*	9.98E-04	1.10E-05	EPA, 1999*	1.79E-05
Acenaphthylene+	1.27E-04	1.54E-06	EPA, 1999*	1.45E-05	3.11E-02	7.60E-06	EPA, 1999*	9.98E-04	1.21E-05	EPA, 1999*	1.97E-05
Anthracene	1.27E-04	1.52E-06	EPA, 1999*	1.44E-05	3.11E-02	7.54E-06	EPA, 1999*	9.98E-04	1.20E-05	EPA, 1999*	1.95E-05
Antimony	1.44E-06	3.79E-06	Sample, 1998a	3.19E-04	5.99E-04	3.15E-04	EPA, 1999*	1.44E-06	3.79E-06	Sample, 199	3.19E-04
Aroclor-1254	5.83E-05	2.51E-07	EPA, 1999	1.30E-06	1.42E-02	6.11E-07	EPA, 1999	4.55E-04	1.96E-06	EPA, 1999	2.57E-06
Barium	2.16E-07	4.50E-05	Sample, 1998a	2.86E-03	8.99E-05	2.81E-03	EPA, 1999	2.16E-07	4.50E-05	Sample, 199	2.86E-03
Benzo(a)anthracene	1.73E-05	1.92E-07	EPA, 1999	1.80E-06	4.20E-03	9.42E-07	EPA, 1999	1.35E-04	1.50E-06	EPA, 1999	2.44E-06
Benzo(a)pyrene	4.86E-05	1.88E-05	EPA, 1999	9.82E-05	1.19E-02	4.65E-05	EPA, 1999	3.81E-04	1.47E-04	EPA, 1999	1.94E-04
Benzo(b)fluoranthene	5.75E-05	1.50E-05	EPA, 1999	7.80E-05	1.40E-02	3.68E-05	EPA, 1999	4.50E-04	1.17E-04	EPA, 1999	1.54E-04
Benzo(g,h,i)perylene	1.27E-04	4.45E-05	EPA, 1999*	4.20E-04	3.11E-02	2.20E-04	EPA, 1999*	9.98E-04	3.49E-04	EPA, 1999*	5.69E-04
Benzo(k)fluoranthene	5.73E-05	9.86E-07	EPA, 1999	5.14E-06	1.39E-02	2.41E-06	EPA, 1999	4.48E-04	7.71E-06	EPA, 1999	1.01E-05
Boron	1.00E+00	1.60E+01	**	3.19E+01	1.00E+00	1.60E+01	**	1.00E+00	1.60E+01	**	3.19E+01
Cadmium	1.73E-07	8.27E-08	Sample, 1998a	1.26E-05	4.71E-02	8.20E-03	EPA, 1999	1.51E-03	7.22E-04	EPA, 1999	8.92E-03
Chromium	7.91E-06	1.80E-04	Sample, 1998a	7.41E-04	3.30E-03	5.62E-04	EPA, 1999	7.91E-06	1.80E-04	Sample, 199	7.41E-04
Chrysene	1.99E-05	7.84E-06	EPA, 1999	6.88E-05	4.84E-03	3.57E-05	EPA, 1999	1.55E-04	6.11E-05	EPA, 1999	9.67E-05
Copper	5.25E-02	2.35E+00	Sample, 1998a	2.03E+01	1.00E+00	1.79E+01	**	5.25E-02	2.35E+00	Sample, 199	2.03E+01
Dibenz(a,h)anthracene	1.27E-04	1.38E-06	EPA, 1999	5.09E-06	3.11E-02	2.17E-06	EPA, 1999	9.98E-04	1.09E-05	EPA, 1999	1.30E-05
Dieldrin+	1.00E+00	1.83E-04	**	1.83E-04	3.68E-03	2.35E-08	EPA, 1998	1.00E+00	1.83E-04	**	1.83E-04
Endrin+	1.00E+00	2.22E-04	**	2.22E-04	1.55E-03	1.98E-08	EPA, 1998	1.00E+00	2.22E-04	**	2.22E-04
Endrin ketone+	1.00E+00	5.48E-04	**	5.48E-04	1.55E-03	4.89E-08	EPA, 1998	1.00E+00	5.48E-04	**	5.48E-04
Fluoranthene	1.27E-04	8.20E-05	EPA, 1999*	7.75E-04	3.11E-02	4.06E-04	EPA, 1999*	9.98E-04	6.45E-04	EPA, 1999*	1.05E-03
Fluorene	1.27E-04	1.37E-06	EPA, 1999*	1.30E-05	3.11E-02	6.78E-06	EPA, 1999*	9.98E-04	1.08E-05	EPA, 1999*	1.76E-05
Indeno(1,2,3-cd)pyrene	2.98E-04	1.21E-04	EPA, 1999	3.17E-04	7.24E-02	1.15E-04	EPA, 1999	2.32E-03	9.42E-04	EPA, 1999	1.06E-03
Lead	4.32E-07	4.12E-05	EPA, 1999	8.14E-04	1.80E-04	7.73E-04	EPA, 1999	4.32E-07	4.12E-05	EPA, 1999	8.14E-04
Lithium	1.00E+00	2.05E+01	**	4.10E+01	1.00E+00	2.05E+01	**	1.00E+00	2.05E+01	**	4.10E+01
Manganese	1.00E+00	5.59E+02	**	6.04E+02	1.00E+00	4.43E+01	**	1.00E+00	5.59E+02	**	6.04E+02
Mercury	1.12E-06	2.76E-08	Sample, 1998a	1.60E-06	1.59E-03	5.36E-06	EPA, 1999	5.12E-05	1.26E-06	EPA, 1999	6.62E-06
Molybdenum	7.91E-06	1.91E-05	Sample, 1998a	7.90E-05	3.30E-03	5.99E-05	EPA, 1999	7.91E-06	1.91E-05	Sample, 199	7.90E-05
Naphthalene	1.27E-04	4.61E-07	EPA, 1999*	4.35E-06	3.11E-02	2.28E-06	EPA, 1999*	9.98E-04	3.62E-06	EPA, 1999*	5.90E-06
Nickel	8.63E-06	1.65E-04	EPA, 1999	2.37E-03	3.60E-03	2.20E-03	EPA, 1999	8.63E-06	1.65E-04	EPA, 1999	2.37E-03
Phenanthrene	1.27E-04	7.42E-05	EPA, 1999*	7.01E-04	3.11E-02	3.67E-04	EPA, 1999*	9.98E-04	5.83E-04	EPA, 1999*	9.50E-04
Pyrene	1.27E-04	1.46E-04	EPA, 1999*	1.38E-03	3.11E-02	7.22E-04	EPA, 1999*	9.98E-04	1.15E-03	EPA, 1999*	1.87E-03
Vanadium	7.91E-06	1.81E-04	Sample, 1998a	7.47E-04	3.30E-03	5.66E-04	EPA, 1999	7.91E-06	1.81E-04	Sample, 199	7.47E-04
Zinc	1.29E-07	1.52E-04	EPA, 1999	1.52E-04	3.89E-03	5.51E-12	EPA, 1999	1.25E-04	1.48E-01	EPA, 1999	1.48E-01
LPAH	1.27E-04	8.04E-05	EPA, 1999*	7.60E-04	3.11E-02	3.98E-04	EPA, 1999*	9.98E-04	6.32E-04	EPA, 1999*	1.03E-03
HPAH	1.27E-04	4.61E-04	EPA, 1999*	4.36E-03	3.11E-02	2.28E-03	EPA, 1999*	9.98E-04	3.62E-03	EPA, 1999*	5.91E-03
TOTAL PAHs	1.27E-04	5.42E-04	EPA, 1999*	5.07E-03	3.11E-02	2.65E-03	EPA, 1999*	9.98E-04	4.26E-03	EPA, 1999*	6.91E-03

Notes:
+surface soil data were used because it was not a COPEC for all soil.
For vanadium and molybdenum, the BCF values for chromium were used since they are in transitional elements with similar properties.
* For BAFs and BCFs for LPAHs and HPAHs, the most conservative value for the individual PAHs was used to estimated food concentrations.
**If no BAF or BCF was available in the literature, a default value of 1.0 was used.

TABLE E-1
EXPOSURE POINT CONCENTATION (mg/kg)
BACKGROUND SOIL*

Parameter		Exposure Point Concentration	Statistic Used
Antimony	<	8.90E-01	median
Barium		9.02E+02	97.5% Chebyshev
Benzo(a)anthracene	<	7.61E-03	median
Benzo(a)pyrene	<	1.00E-02	median
Benzo(b)fluoranthene	<	8.22E-03	median
Benzo(g,h,i)perylene	<	3.50E-02	median
Benzo(k)fluoranthene	<	1.15E-02	median
Cadmium	<	1.90E-02	median
Chromium		1.70E+01	95% Student's-t
Chrysene	<	1.40E-02	median
Copper		1.44E+01	95% Student's-t
Fluoranthene	<	1.15E-02	median
Indeno(1,2,3-cd)pyrene	<	2.95E-02	median
Lead		1.43E+01	95% Student's-t
Lithium		2.41E+01	95% Student's-t
Manganese		5.07E+02	95% Chebyshev
Mercury		2.41E-02	95% Student's-t
Phenanthrene	<	6.72E-03	median
Pyrene	<	2.00E-02	median
Zinc		7.50E+02	95% Chebyshev
LPAH		6.72E-03	
HPAH		1.47E-01	
TOTAL PAHs		1.54E-01	

Notes:
* Background soil samples were collected from 0 to 0.5 feet below ground surface.

TABLE E-2
TOXICITY REFERENCE VALUES

Parameter	Invertebrate (Earthworm) (mg/kg)	Ref.	Comments	Small Mammalian Herbivore (Deer Mouse) (mg/kgBW-day)	Ref.	Comments	Large Mammalian Carnivore (Coyote) (mg/kgBW-day)	Ref.	Comments	Small Mammalian Omnivore (Least Shrew) (mg/kgBW-day)	Ref.	Comments	Avian Herbivore/Omnivore (American Robin) (mg/kgBW-day)	Ref.	Comments	Large Avian Carnivore (Red-tailed Hawk) (mg/kgBW-day)	Ref.	Comments
Antimony	3.00E+01	EPA, 2005a	EC20 for earthworms	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1	1.25E-01	Sample, 1996	Chronic LOAEL in mouse with an uncertainty factor of 0.1						
Barium	3.30E+02	EPA, 2005g	Geometric mean of the EC20 values for three test species under three separate test conditions of pH	5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	5.18E+01	EPA, 2005g	Geometric mean of NOAEL values for reproduction and growth	1.91E+01	EPA, 1999		3.15E+01	EPA, 1999	
Benzo(a)anthracene																		
Benzo(a)pyrene																		
Benzo(b)fluoranthene																		
Benzo(g,h,i)perylene																		
Benzo(k)fluoranthene																		
Cadmium	1.00E+01	EPA, 1999	Chronic (4-month) NOAEL for cocoon production in earthworm (dose 10)	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	7.70E-01	EPA, 2005b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth
Chromium	5.70E+01	EPA, 2005c	Maximum acceptable toxicant concentration (MATC) for reproductive effects in earthworm	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.40E+00	EPA, 2005c	Geometric mean of NOAEL values for reproduction and growth	2.66E+00	EPA, 2005c	Geometric mean of the NOAEL values for reproduction and growth	2.66E+00	EPA, 2005c	Geometric mean of the NOAEL values for reproduction and growth
Chrysene																		
Copper	8.00E+01	EPA, 2007c	Geometric mean of the MATC and EC10 values for six test species under different test species	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	5.60E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Fluoranthene																		
Indeno(1,2,3-cd)pyrene																		
Lead	1.70E+03	EPA, 2005e	Geometric mean of MATC values for one test species under different pH	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.70E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Lithium				1.10E+01	Sample, 1996		7.50E+00	Sample, 1996		1.20E+01	Sample, 1996							
Manganese				1.06E+02	Sample, 1996		7.00E+01	Sample, 1996		1.15E+02	Sample, 1996		9.98E+02	Sample, 1996		1.64E+03	Sample, 1996	
Mercury	2.50E+00	EPA, 1999	Toxicity value not available -- TRV for methyl mercury was used as a surrogate	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	1.01E+00	EPA, 1999	Chronic (6-months) NOAEL for reproduction in mink (dose 1.01 with uncertainty factor of 1)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)
Phenanthrene																		
Pyrene																		
Zinc	1.20E+02	EPA, 2007e	Geometric mean of the MATC and EC10 values for three test species under different test species	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	7.54E+01	EPA, 2007e	Geometric mean of NOAEL values for reproduction and growth	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups
LPAH	2.90E+01	EPA, 2007b		6.56E+01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.56E+01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.56E+01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.56E+01		Mammalian TRV	6.56E+01		Mammalian TRV
HPAH	1.80E+01	EPA, 2007b		6.15E-01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.15E-01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.15E-01	EPA, 2007b	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.15E-01		Mammalian TRV	6.15E-01		Mammalian TRV
TOTAL PAHs																		

Notes:
EPA, 2007a -- DDT
EPA, 2007b -- PAHs
EPA, 2007c -- Copper
EPA, 2007d -- Nickel
EPA, 2007e -- Zinc
EPA, 2007f -- Selenium
EPA, 2005a -- Antimony
EPA, 2005b -- Cadmium
EPA, 2005c -- Chromium
EPA, 2005d -- Vanadium
EPA, 2005e -- Lead
EPA, 2005f -- Dieldrin
EPA, 2005g -- Barium

TABLE E-3
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR BACKGROUND SOIL
Invertebrate (EARTHWORM)

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Soil Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table E-2

Chemical	**Exposure Point Concentration* (Sc)**	**TRV (earthworm)**	**Maximum EHQ+**
Antimony	2.19E+00	3.00E+01	7.30E-02
Barium	1.13E+03	3.30E+02	3.42E+00
Benzo(a)anthracene	8.20E-02		
Benzo(a)pyrene	7.60E-02		
Benzo(b)fluoranthene	5.70E-02		
Benzo(g,h,i)perylene	8.30E-02		
Benzo(k)fluoranthene	1.06E-01		
Cadmium	1.10E-01	1.00E+01	1.10E-02
Chromium	2.01E+01	5.70E+01	3.53E-01
Chrysene	8.30E-02		
Copper	1.93E+01	8.00E+01	2.41E-01
Fluoranthene	1.56E-01		
Indeno(1,2,3-cd)pyrene	4.17E-01		
Lead	1.52E+01	1.70E+03	8.94E-03
Lithium	3.25E+01		
Manganese	5.51E+02		
Mercury	3.00E-02	2.50E+00	1.20E-02
Phenanthrene	1.37E-01		
Pyrene	1.27E-01		
Zinc	9.69E+02	1.20E+02	8.08E+00
LPAH	6.72E-03	2.90E+01	2.32E-04
HPAH	1.19E+00	1.80E+01	6.59E-02
TOTAL PAHs	1.19E+00		

Notes:
+Shading indicates HQ > 1.
*EPC for sedentary receptor is maximum measured concentration.

TABLE E-4
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Small Mammalian Herbivore/Omnivore (DEER MOUSE)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	See Table E-1	
IR	Maximum Ingestion rate of soil (kg/day)*	1.50E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.50E+02	avis and Schmidly, 2009

Chemical	Sc	Intake
Antimony	8.90E-01	8.90E-09
Barium	9.02E+02	9.02E-06
Benzo(a)anthracene	7.61E-03	7.61E-11
Benzo(a)pyrene	1.00E-02	1.00E-10
Benzo(b)fluoranthene	8.22E-03	8.22E-11
Benzo(g,h,i)perylene	3.50E-02	3.50E-10
Benzo(k)fluoranthene	1.15E-02	1.15E-10
Cadmium	1.90E-02	1.90E-10
Chromium	1.70E+01	1.70E-07
Chrysene	1.40E-02	1.40E-10
Copper	1.44E+01	1.44E-07
Fluoranthene	1.15E-02	1.15E-10
Indeno(1,2,3-cd)pyrene	2.95E-02	2.95E-10
Lead	1.43E+01	1.43E-07
Lithium	2.41E+01	2.41E-07
Manganese	5.07E+02	5.07E-06
Mercury	2.41E-02	2.41E-10
Phenanthrene	6.72E-03	6.72E-11
Pyrene	2.00E-02	2.00E-10
Zinc	7.50E+02	7.50E-06
LPAH	6.72E-03	6.72E-11
HPAH	1.47E-01	1.47E-09
TOTAL PAHs	1.54E-01	1.54E-09

FOOD INGESTION

INTAKE = ((Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ca	Arthropod concentration (mg/kg)	see Table E-14	
Cp	Plant concentration (mg/kg)	see Table E-14	
IR	Maximum Ingestion rate of of food (kg/day)*	7.49E-05	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	1.00E-01	Prof Judgment
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	9.00E-01	Prof Judgment
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.50E-02	avis and Schmidly, 2009

Chemical	Arthropod	Plant	Intake
Antimony	1.96E-01	1.78E-01	8.98E-04
Barium	1.98E+02	1.35E+02	7.07E-01
Benzo(a)anthracene	2.28E-04	1.54E-04	8.05E-07
Benzo(a)pyrene	7.00E-04	1.01E-04	8.03E-07
Benzo(b)fluoranthene	5.75E-04	8.30E-05	6.60E-07
Benzo(g,h,i)perylene	2.45E-03	7.07E-04	4.40E-06
Benzo(k)fluoranthene	9.20E-04	1.16E-04	9.81E-07
Cadmium	1.82E-02	6.92E-03	4.02E-05
Chromium	1.70E-01	1.27E-01	6.56E-04
Chrysene	5.60E-04	2.62E-04	1.46E-06
Copper	5.76E-01	5.76E+00	2.62E-02
Fluoranthene	8.05E-04	2.32E-04	1.45E-06
Indeno(1,2,3-cd)pyrene	2.36E-03	1.15E-04	1.70E-06
Lead	4.30E-01	6.45E-01	3.11E-03
Lithium	2.41E+01	2.41E+01	1.20E-01
Manganese	3.06E+01	4.01E+01	1.96E-01
Mercury	2.05E-01	3.30E-03	1.17E-04
Phenanthrene	4.70E-04	1.36E-04	8.45E-07
Pyrene	1.40E-03	4.04E-04	2.51E-06
Zinc	4.20E+02	8.99E-10	2.10E-01
LPAH	4.70E-04	1.36E-04	8.45E-07
HPAH	1.03E-02	2.98E-03	1.85E-05
TOTAL PAHs	1.08E-02	3.11E-03	1.94E-05

TABLE E-4
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Small Mammalian Herbivore/Omnivore (DEER MOUSE)

TABLE E-4
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Small Mammalian Herbivore/Omnivore (DEER MOUSE)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
Antimony	8.98E-04
Barium	7.07E-01
Benzo(a)anthracene	8.05E-07
Benzo(a)pyrene	8.04E-07
Benzo(b)fluoranthene	6.60E-07
Benzo(g,h,i)perylene	4.40E-06
Benzo(k)fluoranthene	9.81E-07
Cadmium	4.02E-05
Chromium	6.56E-04
Chrysene	1.46E-06
Copper	2.62E-02
Fluoranthene	1.45E-06
Indeno(1,2,3-cd)pyrene	1.70E-06
Lead	3.11E-03
Lithium	1.20E-01
Manganese	1.96E-01
Mercury	1.17E-04
Phenanthrene	8.45E-07
Pyrene	2.51E-06
Zinc	2.10E-01
LPAH	8.45E-07
HPAH	1.85E-05
TOTAL PAHs	1.94E-05

Notes:
* Expressed in dry weight.

TABLE E-5
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Large Mammalian Carnivore (COYOTE)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table E-1	
IR	Maximum Ingestion rate of soil (kg/day)*	4.83E-05	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.40E+01	avis and Schmidly, 2009

Chemical	Sc	Intake
Antimony	8.90E-01	3.07E-06
Barium	9.02E+02	3.11E-03
Benzo(a)anthracene	7.61E-03	2.63E-08
Benzo(a)pyrene	1.00E-02	3.45E-08
Benzo(b)fluoranthene	8.22E-03	2.84E-08
Benzo(g,h,i)perylene	3.50E-02	1.21E-07
Benzo(k)fluoranthene	1.15E-02	3.97E-08
Cadmium	1.90E-02	6.56E-08
Chromium	1.70E+01	5.85E-05
Chrysene	1.40E-02	4.83E-08
Copper	1.44E+01	4.97E-05
Fluoranthene	1.15E-02	3.97E-08
Indeno(1,2,3-cd)pyrene	2.95E-02	1.02E-07
Lead	1.43E+01	4.94E-05
Lithium	2.41E+01	8.32E-05
Manganese	5.07E+02	1.75E-03
Mercury	2.41E-02	8.31E-08
Phenanthrene	6.72E-03	2.32E-08
Pyrene	2.00E-02	6.90E-08
Zinc	7.50E+02	2.59E-03
LPAH	6.72E-03	2.32E-08
HPAH	1.47E-01	5.08E-07
TOTAL PAHs	1.54E-01	5.31E-07

FOOD INGESTION

INTAKE = ((Cm * IR * Dfm * AUF)/(BW) + (Cb * IR * DFb * AUF) / (BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cm	Mammal concentration (mg/kg)	see Table E-14	
Cb	Bird concentration (mg/kg)	see Table E-14	
IR	Maximum Ingestion rate of of food (kg/day)*	2.41E-03	EPA, 1993
Dfm	Dietary fraction of small mammals (unitless)	7.50E-01	EPA, 1993
Dfb	Dietary fraction of birds (unitless)	2.50E-01	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.40E+01	EPA, 1993

Chemical	Mammal	Bird	Intake
Antimony	1.08E-04	1.08E-04	1.86E-08
Barium	1.24E-02	1.24E-02	2.13E-06
Benzo(a)anthracene	1.24E-06	1.67E-06	2.32E-10
Benzo(a)pyrene	2.54E-06	5.01E-06	5.43E-10
Benzo(b)fluoranthene	2.47E-06	4.86E-06	5.27E-10
Benzo(g,h,i)perylene	4.20E-05	5.69E-05	7.87E-09
Benzo(k)fluoranthene	3.43E-06	6.77E-06	7.35E-10
Cadmium	5.01E-07	3.54E-04	1.53E-08
Chromium	5.54E-04	5.54E-04	9.53E-08
Chrysene	2.44E-06	3.44E-06	4.63E-10
Copper	6.52E+00	6.52E+00	1.12E-03
Fluoranthene	1.38E-05	1.87E-05	2.59E-09
Indeno(1,2,3-cd)pyrene	2.31E-05	7.68E-05	6.28E-09
Lead	1.22E-04	1.22E-04	2.10E-08
Lithium	4.83E+01	4.83E+01	8.31E-03
Manganese	5.47E+02	5.47E+02	9.41E-02
Mercury	1.57E-06	6.48E-06	4.82E-10
Phenanthrene	8.06E-06	1.09E-05	1.51E-09
Pyrene	2.40E-05	3.25E-05	4.50E-09
Zinc	9.67E-05	9.37E-02	4.04E-06
LPAH	8.06E-06	1.09E-05	1.51E-09
HPAH	1.77E-04	2.40E-04	3.31E-08
TOTAL PAHs	1.85E-04	2.51E-04	3.46E-08

TABLE E-5
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Large Mammalian Carnivore (COYOTE)

TABLE E-5
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Large Mammalian Carnivore (COYOTE)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
Antimony	3.09E-06
Barium	3.11E-03
Benzo(a)anthracene	2.65E-08
Benzo(a)pyrene	3.50E-08
Benzo(b)fluoranthene	2.89E-08
Benzo(g,h,i)perylene	1.29E-07
Benzo(k)fluoranthene	4.04E-08
Cadmium	8.09E-08
Chromium	5.86E-05
Chrysene	4.88E-08
Copper	1.17E-03
Fluoranthene	4.23E-08
Indeno(1,2,3-cd)pyrene	1.08E-07
Lead	4.95E-05
Lithium	8.39E-03
Manganese	9.59E-02
Mercury	8.36E-08
Phenanthrene	2.47E-08
Pyrene	7.35E-08
Zinc	2.59E-03
LPAH	2.47E-08
HPAH	5.41E-07
TOTAL PAHs	5.66E-07

Notes:
* Expressed in dry weight.

TABLE E-6
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Small Mammalian Omnivore (LEAST SHREW)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table E-1	
IR	Maximum Ingestion rate of soil (kg/day)*	2.71E-07	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	4.00E-03	Davis and Schmidly, 2009

Chemical	Sc	Intake
Antimony	8.90E-01	6.03E-05
Barium	9.02E+02	6.11E-02
Benzo(a)anthracene	7.61E-03	5.16E-07
Benzo(a)pyrene	1.00E-02	6.78E-07
Benzo(b)fluoranthene	8.22E-03	5.57E-07
Benzo(g,h,i)perylene	3.50E-02	2.37E-06
Benzo(k)fluoranthene	1.15E-02	7.79E-07
Cadmium	1.90E-02	1.29E-06
Chromium	1.70E+01	1.15E-03
Chrysene	1.40E-02	9.49E-07
Copper	1.44E+01	9.76E-04
Fluoranthene	1.15E-02	7.79E-07
Indeno(1,2,3-cd)pyrene	2.95E-02	2.00E-06
Lead	1.43E+01	9.71E-04
Lithium	2.41E+01	1.63E-03
Manganese	5.07E+02	3.43E-02
Mercury	2.41E-02	1.63E-06
Phenanthrene	6.72E-03	4.55E-07
Pyrene	2.00E-02	1.36E-06
Zinc	7.50E+02	5.08E-02
LPAH	6.72E-03	4.55E-07
HPAH	1.47E-01	9.98E-06
TOTAL PAHs	1.54E-01	1.04E-05

FOOD INGESTION

INTAKE = ((Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ca	Arthropod concentration (mg/kg)	see Table E-14	
Cp	Plant concentration (mg/kg)	see Table E-14	
IR	Maximum Ingestion rate of of food (kg/day)*	3.38E-06	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	9.00E-01	EPA, 1993
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	1.00E-01	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	4.00E-03	Davis and Schmidly, 2009

Chemical	Arthropod	Plant	Intake
Antimony	1.96E-01	1.78E-01	1.64E-04
Barium	1.98E+02	1.35E+02	1.62E-01
Benzo(a)anthracene	2.28E-04	1.54E-04	1.87E-07
Benzo(a)pyrene	7.00E-04	1.01E-04	5.41E-07
Benzo(b)fluoranthene	5.75E-04	8.30E-05	4.45E-07
Benzo(g,h,i)perylene	2.45E-03	7.07E-04	1.92E-06
Benzo(k)fluoranthene	9.20E-04	1.16E-04	7.09E-07
Cadmium	1.82E-02	6.92E-03	1.45E-05
Chromium	1.70E-01	1.27E-01	1.40E-04
Chrysene	5.60E-04	2.62E-04	4.48E-07
Copper	5.76E-01	5.76E+00	9.25E-04
Fluoranthene	8.05E-04	2.32E-04	6.32E-07
Indeno(1,2,3-cd)pyrene	2.36E-03	1.15E-04	1.80E-06
Lead	4.30E-01	6.45E-01	3.81E-04
Lithium	2.41E+01	2.41E+01	2.04E-02
Manganese	3.06E+01	4.01E+01	2.67E-02
Mercury	2.05E-01	3.30E-03	1.56E-04
Phenanthrene	4.70E-04	1.36E-04	3.69E-07
Pyrene	1.40E-03	4.04E-04	1.10E-06
Zinc	4.20E+02	8.99E-10	3.19E-01
LPAH	4.70E-04	1.36E-04	3.69E-07
HPAH	1.03E-02	2.98E-03	8.09E-06
TOTAL PAHs	1.08E-02	3.11E-03	8.46E-06

TABLE E-6
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Small Mammalian Omnivore (LEAST SHREW)

TABLE E-6
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Small Mammalian Omnivore (LEAST SHREW)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
Antimony	2.24E-04
Barium	2.23E-01
Benzo(a)anthracene	7.02E-07
Benzo(a)pyrene	1.22E-06
Benzo(b)fluoranthene	1.00E-06
Benzo(g,h,i)perylene	4.29E-06
Benzo(k)fluoranthene	1.49E-06
Cadmium	1.57E-05
Chromium	1.29E-03
Chrysene	1.40E-06
Copper	1.90E-03
Fluoranthene	1.41E-06
Indeno(1,2,3-cd)pyrene	3.80E-06
Lead	1.35E-03
Lithium	2.20E-02
Manganese	6.10E-02
Mercury	1.58E-04
Phenanthrene	8.24E-07
Pyrene	2.45E-06
Zinc	3.70E-01
LPAH	8.24E-07
HPAH	1.81E-05
TOTAL PAHs	1.89E-05

Notes:
*Expressed in dry weight.

TABLE E-7
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Avian Herbivore/Omnivore (AMERICAN ROBIN)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table E-1	
IR	Maximum Ingestion rate of soil (kg/day)*	2.52E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	6.30E-02	EPA, 1993

Chemical	Sc	Intake
Antimony	8.90E-01	3.56E-05
Barium	9.02E+02	3.61E-02
Benzo(a)anthracene	7.61E-03	3.04E-07
Benzo(a)pyrene	1.00E-02	4.00E-07
Benzo(b)fluoranthene	8.22E-03	3.29E-07
Benzo(g,h,i)perylene	3.50E-02	1.40E-06
Benzo(k)fluoranthene	1.15E-02	4.60E-07
Cadmium	1.90E-02	7.60E-07
Chromium	1.70E+01	6.78E-04
Chrysene	1.40E-02	5.60E-07
Copper	1.44E+01	5.76E-04
Fluoranthene	1.15E-02	4.60E-07
Indeno(1,2,3-cd)pyrene	2.95E-02	1.18E-06
Lead	1.43E+01	5.73E-04
Lithium	2.41E+01	9.65E-04
Manganese	5.07E+02	2.03E-02
Mercury	2.41E-02	9.64E-07
Phenanthrene	6.72E-03	2.69E-07
Pyrene	2.00E-02	8.00E-07
Zinc	7.50E+02	3.00E-02
LPAH	6.72E-03	2.69E-07
HPAH	1.47E-01	5.89E-06
TOTAL PAHs	1.54E-01	6.16E-06

FOOD INGESTION

INTAKE = ((Ce * IR * Dfe * AUF)/(BW) + (Ca * IR * DFa * AUF) / (BW) + ((Cp * IR * DFs *AUF)/(BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Ce	Earthworm concentration (mg/kg)	see Table E-14	
Ca	Arthropod concentration (mg/kg)	see Table E-14	
Cp	Plant concentration (mg/kg)	see Table E-14	
IR	Maximum Ingestion rate of of food (kg/day)*	4.85E-05	EPA, 1993
Dfe	Dietary fraction of earthworms (unitless)	4.60E-01	EPA, 1993
Dfa	Dietary fraction of arthropods (unitless)	4.60E-01	EPA, 1993
Dfs	Dietary fraction of plants, seeds and other vegetation (unitless)	8.00E-02	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	6.30E-02	EPA, 1993

Chemical	Earthworm	Arthropod	Plant	Intake
Antimony	1.96E-01	1.96E-01	1.78E-01	1.50E-04
Barium	1.98E+02	1.98E+02	1.35E+02	1.49E-01
Benzo(a)anthracene	2.28E-04	2.28E-04	1.54E-04	1.71E-07
Benzo(a)pyrene	7.00E-04	7.00E-04	1.01E-04	5.02E-07
Benzo(b)fluoranthene	5.75E-04	5.75E-04	8.30E-05	4.13E-07
Benzo(g,h,i)perylene	2.45E-03	2.45E-03	7.07E-04	1.78E-06
Benzo(k)fluoranthene	9.20E-04	9.20E-04	1.16E-04	6.59E-07
Cadmium	1.82E-02	1.82E-02	6.92E-03	1.33E-05
Chromium	1.70E-01	1.70E-01	1.27E-01	1.28E-04
Chrysene	5.60E-04	5.60E-04	2.62E-04	4.13E-07
Copper	5.76E-01	5.76E-01	5.76E+00	7.63E-04
Fluoranthene	8.05E-04	8.05E-04	2.32E-04	5.84E-07
Indeno(1,2,3-cd)pyrene	2.36E-03	2.36E-03	1.15E-04	1.68E-06
Lead	4.30E-01	4.30E-01	6.45E-01	3.44E-04
Lithium	2.41E+01	2.41E+01	2.41E+01	1.86E-02
Manganese	3.06E+01	3.06E+01	4.01E+01	2.42E-02
Mercury	2.05E-01	2.05E-01	3.30E-03	1.45E-04
Phenanthrene	4.70E-04	4.70E-04	1.36E-04	3.42E-07
Pyrene	1.40E-03	1.40E-03	4.04E-04	1.02E-06
Zinc	4.20E+02	4.20E+02	8.99E-10	2.97E-01
LPAH	4.70E-04	4.70E-04	1.36E-04	3.42E-07
HPAH	1.03E-02	1.03E-02	2.98E-03	7.49E-06
TOTAL PAHs	1.08E-02	1.08E-02	3.11E-03	7.83E-06

TABLE E-7
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Avian Herbivore/Omnivore (AMERICAN ROBIN)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
Antimony	1.85E-04
Barium	1.85E-01
Benzo(a)anthracene	4.76E-07
Benzo(a)pyrene	9.02E-07
Benzo(b)fluoranthene	7.41E-07
Benzo(g,h,i)perylene	3.18E-06
Benzo(k)fluoranthene	1.12E-06
Cadmium	1.41E-05
Chromium	8.06E-04
Chrysene	9.73E-07
Copper	1.34E-03
Fluoranthene	1.04E-06
Indeno(1,2,3-cd)pyrene	2.86E-06
Lead	9.17E-04
Lithium	1.95E-02
Manganese	4.44E-02
Mercury	1.46E-04
Phenanthrene	6.10E-07
Pyrene	1.82E-06
Zinc	3.27E-01
LPAH	6.10E-07
HPAH	1.34E-05
TOTAL PAHs	1.40E-05

Notes:
* Expressed in dry weight.

TABLE E-8
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Large Avian Carnivore (RED-TAILED HAWK)

SOIL INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Soil concentration (mg/kg)	see Table E-1	
IR	Maximum Ingestion rate of soil (kg/day)*	8.97E-06	EPA, 1993
AF	Chemical Bioavailability in soil (unitless)	1	EPA, 1997
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	9.57E-01	EPA, 1993

Chemical	Sc	Intake
Antimony	8.90E-01	8.34E-06
Barium	9.02E+02	8.45E-03
Benzo(a)anthracene	7.61E-03	7.13E-08
Benzo(a)pyrene	1.00E-02	9.37E-08
Benzo(b)fluoranthene	8.22E-03	7.70E-08
Benzo(g,h,i)perylene	3.50E-02	3.28E-07
Benzo(k)fluoranthene	1.15E-02	1.08E-07
Cadmium	1.90E-02	1.78E-07
Chromium	1.70E+01	1.59E-04
Chrysene	1.40E-02	1.31E-07
Copper	1.44E+01	1.35E-04
Fluoranthene	1.15E-02	1.08E-07
Indeno(1,2,3-cd)pyrene	2.95E-02	2.77E-07
Lead	1.43E+01	1.34E-04
Lithium	2.41E+01	2.26E-04
Manganese	5.07E+02	4.75E-03
Mercury	2.41E-02	2.26E-07
Phenanthrene	6.72E-03	6.30E-08
Pyrene	2.00E-02	1.87E-07
Zinc	7.50E+02	7.03E-03
LPAH	6.72E-03	6.30E-08
HPAH	1.47E-01	1.38E-06
TOTAL PAHs	1.54E-01	1.44E-06

FOOD INGESTION

INTAKE = ((Cm * IR * Dfm * AUF)/(BW) + (Cb * IR * DFb * AUF) / (BW))

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cm	Mammal concentration (mg/kg)	see Table E-14	
Cb	Bird concentration (mg/kg)	see Table E-14	
IR	Maximum Ingestion rate of of food (kg/day)*	4.48E-04	EPA, 1993
Dfm	Dietary fraction of small mammals (unitless)	7.85E-01	EPA, 1993
Dfb	Dietary fraction of birds (unitless)	1.00E+00	EPA, 1993
AUF	Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	9.57E-01	EPA, 1993

Chemical	Mammal	Bird	Intake
Antimony	1.08E-04	1.08E-04	9.02E-08
Barium	1.24E-02	1.24E-02	1.03E-05
Benzo(a)anthracene	1.24E-06	1.67E-06	1.24E-09
Benzo(a)pyrene	2.54E-06	5.01E-06	3.28E-09
Benzo(b)fluoranthene	2.47E-06	4.86E-06	3.18E-09
Benzo(g,h,i)perylene	4.20E-05	5.69E-05	4.21E-08
Benzo(k)fluoranthene	3.43E-06	6.77E-06	4.43E-09
Cadmium	5.01E-07	3.54E-04	1.66E-07
Chromium	5.54E-04	5.54E-04	4.63E-07
Chrysene	2.44E-06	3.44E-06	2.51E-09
Copper	6.52E+00	6.52E+00	5.45E-03
Fluoranthene	1.38E-05	1.87E-05	1.38E-08
Indeno(1,2,3-cd)pyrene	2.31E-05	7.68E-05	4.44E-08
Lead	1.22E-04	1.22E-04	1.02E-07
Lithium	4.83E+01	4.83E+01	4.03E-02
Manganese	5.47E+02	5.47E+02	4.57E-01
Mercury	1.57E-06	6.48E-06	3.61E-09
Phenanthrene	8.06E-06	1.09E-05	8.08E-09
Pyrene	2.40E-05	3.25E-05	2.40E-08
Zinc	9.67E-05	9.37E-02	4.39E-05
LPAH	8.06E-06	1.09E-05	8.08E-09
HPAH	1.77E-04	2.40E-04	1.77E-07
TOTAL PAHs	1.85E-04	2.51E-04	1.85E-07

TABLE E-8
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Large Avian Carnivore (RED-TAILED HAWK)

TABLE E-8
INTAKE CALCULATIONS FOR BACKGROUND SOIL
Large Avian Carnivore (RED-TAILED HAWK)

TOTAL INTAKE

INTAKE = Soil Intake + Food Intake

Chemical	Total Intake
Antimony	8.43E-06
Barium	8.46E-03
Benzo(a)anthracene	7.26E-08
Benzo(a)pyrene	9.70E-08
Benzo(b)fluoranthene	8.02E-08
Benzo(g,h,i)perylene	3.70E-07
Benzo(k)fluoranthene	1.12E-07
Cadmium	3.44E-07
Chromium	1.59E-04
Chrysene	1.34E-07
Copper	5.58E-03
Fluoranthene	1.22E-07
Indeno(1,2,3-cd)pyrene	3.21E-07
Lead	1.34E-04
Lithium	4.06E-02
Manganese	4.62E-01
Mercury	2.30E-07
Phenanthrene	7.11E-08
Pyrene	2.12E-07
Zinc	7.07E-03
LPAH	7.11E-08
HPAH	1.56E-06
TOTAL PAHs	1.63E-06

Notes:
* Expressed in dry weight.

TABLE E-9
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR BACKGROUND SOIL
Small Mammalian Herbivore (DEER MOUSE)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	See Table E-2

Chemical	Intake	TRV (deer mouse)	EHQ
Antimony	8.98E-04	1.25E-01	7.18E-03
Barium	7.07E-01	5.18E+01	1.37E-02
Benzo(a)anthracene	8.05E-07		
Benzo(a)pyrene	8.04E-07		
Benzo(b)fluoranthene	6.60E-07		
Benzo(g,h,i)perylene	4.40E-06		
Benzo(k)fluoranthene	9.81E-07		
Cadmium	4.02E-05	7.70E-01	< 5.22E-05
Chromium	6.56E-04	2.40E+00	2.73E-04
Chrysene	1.46E-06		
Copper	2.62E-02	5.60E+00	4.68E-03
Fluoranthene	1.45E-06		
Indeno(1,2,3-cd)pyrene	1.70E-06		
Lead	3.11E-03	4.70E+00	6.62E-04
Lithium	1.20E-01	1.10E+01	1.10E-02
Manganese	1.96E-01	1.06E+02	1.85E-03
Mercury	1.17E-04	1.01E+00	1.16E-04
Phenanthrene	8.45E-07		
Pyrene	2.51E-06		
Zinc	2.10E-01	7.54E+01	2.78E-03
LPAH	8.45E-07	6.56E+01	1.29E-08
HPAH	1.85E-05	6.15E-01	3.01E-05
TOTAL PAHs	1.94E-05		

TABLE E-10
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR BACKGROUND SOIL
Large Mammalian Carnivore (COYOTE)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table E-2

Chemical	**Intake**	**TRV Coyote**		**EHQ**
Antimony	3.09E-06	1.25E-01		2.47E-05
Barium	3.11E-03	5.18E+01		6.01E-05
Benzo(a)anthracene	2.65E-08			
Benzo(a)pyrene	3.50E-08			
Benzo(b)fluoranthene	2.89E-08			
Benzo(g,h,i)perylene	1.29E-07			
Benzo(k)fluoranthene	4.04E-08			
Cadmium	8.09E-08	7.70E-01	<	1.05E-07
Chromium	5.86E-05	2.40E+00		2.44E-05
Chrysene	4.88E-08			
Copper	1.17E-03	5.60E+00		2.09E-04
Fluoranthene	4.23E-08			
Indeno(1,2,3-cd)pyrene	1.08E-07			
Lead	4.95E-05	4.70E+00		1.05E-05
Lithium	8.39E-03	7.50E+00		1.12E-03
Manganese	9.59E-02	7.00E+01		1.37E-03
Mercury	8.36E-08	1.01E+00		8.28E-08
Phenanthrene	2.47E-08			
Pyrene	7.35E-08			
Zinc	2.59E-03	7.54E+01		3.43E-05
LPAH	2.47E-08	6.56E+01		3.76E-10
HPAH	5.41E-07	6.15E-01		8.80E-07
TOTAL PAHs	5.66E-07			

TABLE E-11
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR BACKGROUND SOIL SOUTH OF MARLIN
Small Mammalian Omnivore (LEAST SHREW)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table E-2

Chemical	Intake	TRV Least Shrew		EHQ
Antimony	2.24E-04	1.25E-01		1.79E-03
Barium	2.23E-01	5.18E+01		4.31E-03
Benzo(a)anthracene	7.02E-07			
Benzo(a)pyrene	1.22E-06			
Benzo(b)fluoranthene	1.00E-06			
Benzo(g,h,i)perylene	4.29E-06			
Benzo(k)fluoranthene	1.49E-06			
Cadmium	1.57E-05	7.70E-01	<	2.04E-05
Chromium	1.29E-03	2.40E+00		5.37E-04
Chrysene	1.40E-06			
Copper	1.90E-03	5.60E+00		3.40E-04
Fluoranthene	1.41E-06			
Indeno(1,2,3-cd)pyrene	3.80E-06			
Lead	1.35E-03	4.70E+00		2.88E-04
Lithium	2.20E-02	1.20E+01		1.84E-03
Manganese	6.10E-02	1.15E+02		5.31E-04
Mercury	1.58E-04	1.01E+00		1.56E-04
Phenanthrene	8.24E-07			
Pyrene	2.45E-06			
Zinc	3.70E-01	7.54E+01		4.91E-03
LPAH	8.24E-07	6.56E+01		1.26E-08
HPAH	1.81E-05	6.15E-01		2.94E-05
TOTAL PAHs	1.89E-05			

TABLE E-12
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR BACKGROUND SOIL
Avian Herbivore/Omnivore (AMERICAN ROBIN)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table E-2

Chemical	Intake	TRV American Robin	EHQ
Antimony	1.85E-04		
Barium	1.85E-01	1.91E+01	9.68E-03
Benzo(a)anthracene	4.76E-07		
Benzo(a)pyrene	9.02E-07		
Benzo(b)fluoranthene	7.41E-07		
Benzo(g,h,i)perylene	3.18E-06		
Benzo(k)fluoranthene	1.12E-06		
Cadmium	1.41E-05	1.47E+00	< 9.59E-06
Chromium	8.06E-04	2.66E+00	3.03E-04
Chrysene	9.73E-07		
Copper	1.34E-03	4.05E+00	3.31E-04
Fluoranthene	1.04E-06		
Indeno(1,2,3-cd)pyrene	2.86E-06		
Lead	9.17E-04	1.63E+00	5.63E-04
Lithium	1.95E-02		
Manganese	4.44E-02	9.98E+02	4.45E-05
Mercury	1.46E-04	3.25E+00	4.50E-05
Phenanthrene	6.10E-07		
Pyrene	1.82E-06		
Zinc	3.27E-01	6.61E+01	4.95E-03
LPAH	6.10E-07	6.56E+01	9.30E-09
HPAH	1.34E-05	6.15E-01	2.18E-05
TOTAL PAHs	1.40E-05		

TABLE E-13
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR BACKGROUND SOIL
Large Avian Carnivore (RED-TAILED HAWK)

Ecological Hazard Quotient = Intake/TRV

Parameter	Definition	Default
Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table E-2

Chemical	**Intake**	**TRV Red-Tailed Hawk**		**EHQ**
Antimony	8.43E-06			
Barium	8.46E-03	3.15E+01		2.69E-04
Benzo(a)anthracene	7.26E-08			
Benzo(a)pyrene	9.70E-08			
Benzo(b)fluoranthene	8.02E-08			
Benzo(g,h,i)perylene	3.70E-07			
Benzo(k)fluoranthene	1.12E-07			
Cadmium	3.44E-07	1.47E+00	<	2.34E-07
Chromium	1.59E-04	2.66E+00		5.99E-05
Chrysene	1.34E-07			
Copper	5.58E-03	4.05E+00		1.38E-03
Fluoranthene	1.22E-07			
Indeno(1,2,3-cd)pyrene	3.21E-07			
Lead	1.34E-04	1.63E+00		8.25E-05
Lithium	4.06E-02			
Manganese	4.62E-01	1.64E+03		2.81E-04
Mercury	2.30E-07	3.25E+00		7.06E-08
Phenanthrene	7.11E-08			
Pyrene	2.12E-07			
Zinc	7.07E-03	6.61E+01		1.07E-04
LPAH	7.11E-08	6.56E+01		1.08E-09
HPAH	1.56E-06	6.15E-01		2.53E-06
TOTAL PAHs	1.63E-06			

TABLE E-14
CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg)

Cfood = Csoil x BCF (or BAF)

where:

Cfood = Chemical Concentration in food (mg/kg dry)
Csoil = Chemical Concentration in soil (mg/kg dry)
BCF = Bioconcentration Factor (unitless)
BAF = Bioaccumulation Factor (unitless)

Compound	Csoil (mg/kg)	Soil to Earthworm BCF	Earthworm Concentration	Reference	Soil to Arthropod BCF	Arthropod Concentration	Reference	Soil to Plant BAF	Plant/Fruit/Seed Concentration	Reference	Plant to Wildlife BCF	Plant to Deer Mouse Concentration	Reference	Soil to Wildlife BCF	Soil to Deer Mouse Concentration	Reference	TOTAL DEER MOUSE CONCENTRATION	Plant to Bird BCF	Plant to Bird Concentration	Reference	Soil to Bird BCF	Soil to Bird Concentration	Reference	TOTAL BIRD CONCENTRATION
Antimony	8.90E-01	2.20E-01	1.96E-01	Sample, 199	2.20E-01	1.96E-01	Sample, 199	2.00E-01	1.78E-01	Bechtel, 199	5.99E-04	1.07E-04	EPA, 1999	1.44E-06	1.28E-06	Sample, 1998a	1.08E-04	5.99E-04	1.07E-04	EPA, 1999*	1.44E-06	1.28E-06	Sample, 199	1.08E-04
Barium	9.02E+02	2.20E-01	1.98E+02	Sample, 199	2.20E-01	1.98E+02	Sample, 199	1.50E-01	1.35E+02	Bechtel, 199	8.99E-05	1.22E-02	EPA, 1999	2.16E-07	1.95E-04	Sample, 1998a	1.24E-02	8.99E-05	1.22E-02	EPA, 1999	2.16E-07	1.95E-04	Sample, 199	1.24E-02
Benzo(a)anthracene	7.61E-03	3.00E-02	2.28E-04	EPA, 1999	3.00E-02	2.28E-04	EPA, 1999	2.02E-02	1.54E-04	EPA, 1999	7.19E-03	1.11E-06	EPA, 1999	1.73E-05	1.32E-07	EPA, 1999	1.24E-06	4.20E-03	6.46E-07	EPA, 1999	1.35E-04	1.03E-06	EPA, 1999	1.67E-06
Benzo(a)pyrene	1.00E-02	7.00E-02	7.00E-04	EPA, 1999	7.00E-02	7.00E-04	EPA, 1999	1.01E-02	1.01E-04	EPA, 1999	2.03E-02	2.05E-06	EPA, 1999	4.86E-05	4.86E-07	EPA, 1999	2.54E-06	1.19E-02	1.20E-06	EPA, 1999	3.81E-04	3.81E-06	EPA, 1999	5.01E-06
Benzo(b)fluoranthene	8.22E-03	7.00E-02	5.75E-04	EPA, 1999	7.00E-02	5.75E-04	EPA, 1999	1.01E-02	8.30E-05	EPA, 1999	2.40E-02	1.99E-06	EPA, 1999	5.75E-05	4.73E-07	EPA, 1999	2.47E-06	1.40E-02	1.16E-06	EPA, 1999	4.50E-04	3.70E-06	EPA, 1999	4.86E-06
Benzo(g,h,i)perylene	3.50E-02	7.00E-02	2.45E-03	EPA, 1999*	7.00E-02	2.45E-03	EPA, 1999*	2.02E-02	7.07E-04	EPA, 1999*	5.31E-02	3.75E-05	EPA, 1999*	1.27E-04	4.45E-06	EPA, 1999*	4.20E-05	3.11E-02	2.20E-05	EPA, 1999*	9.98E-04	3.49E-05	EPA, 1999*	5.69E-05
Benzo(k)fluoranthene	1.15E-02	8.00E-02	9.20E-04	EPA, 1999	8.00E-02	9.20E-04	EPA, 1999	1.01E-02	1.16E-04	EPA, 1999	2.39E-02	2.78E-06	EPA, 1999	5.73E-05	6.59E-07	EPA, 1999	3.43E-06	1.39E-02	1.61E-06	EPA, 1999	4.48E-04	5.15E-06	EPA, 1999	6.77E-06
Cadmium	1.90E-02	9.60E-01	1.82E-02	Sample, 199	9.60E-01	1.82E-02	Sample, 199	3.64E-01	6.92E-03	Bechtel, 199	7.19E-05	4.97E-07	EPA, 1999	1.73E-07	3.29E-09	Sample, 1998a	5.01E-07	4.71E-02	3.26E-04	EPA, 1999	1.51E-03	2.87E-05	EPA, 1999	3.54E-04
Chromium	1.70E+01	1.00E-02	1.70E-01	Sample, 199	1.00E-02	1.70E-01	Sample, 199	7.50E-03	1.27E-01	Bechtel, 199	3.30E-03	4.20E-04	EPA, 1999	7.91E-06	1.34E-04	Sample, 1998a	5.54E-04	3.30E-03	4.20E-04	EPA, 1999	7.91E-06	1.34E-04	Sample, 199	5.54E-04
Chrysene	1.40E-02	4.00E-02	5.60E-04	EPA, 1999	4.00E-02	5.60E-04	EPA, 1999	1.87E-02	2.62E-04	EPA, 1999	8.27E-03	2.17E-06	EPA, 1999	1.99E-05	2.79E-07	EPA, 1999	2.44E-06	4.84E-03	1.27E-06	EPA, 1999	1.55E-04	2.17E-06	EPA, 1999	3.44E-06
Copper	1.44E+01	4.00E-02	5.76E-01	EPA, 1999	4.00E-02	5.76E-01	EPA, 1999	4.00E-01	5.76E+00	EPA, 1999	1.00E+00	5.76E+00	**	5.25E-02	7.57E-01	Sample, 1998a	6.52E+00	1.00E+00	5.76E+00	**	5.25E-02	7.57E-01	Sample, 199	6.52E+00
Fluoranthene	1.15E-02	7.00E-02	8.05E-04	EPA, 1999*	7.00E-02	8.05E-04	EPA, 1999*	2.02E-02	2.32E-04	EPA, 1999*	5.31E-02	1.23E-05	EPA, 1999*	1.27E-04	1.46E-06	EPA, 1999*	1.38E-05	3.11E-02	7.22E-06	EPA, 1999*	9.98E-04	1.15E-05	EPA, 1999*	1.87E-05
Indeno(1,2,3-cd)pyrene	2.95E-02	8.00E-02	2.36E-03	EPA, 1999	8.00E-02	2.36E-03	EPA, 1999	3.90E-03	1.15E-04	EPA, 1999	1.24E-01	1.43E-05	EPA, 1999	2.98E-04	8.79E-06	EPA, 1999	2.31E-05	7.24E-02	8.33E-06	EPA, 1999	2.32E-03	6.84E-05	EPA, 1999	7.68E-05
Lead	1.43E+01	3.00E-02	4.30E-01	EPA, 1999	3.00E-02	4.30E-01	EPA, 1999	4.50E-02	6.45E-01	EPA, 1999	1.80E-04	1.16E-04	EPA, 1999	4.32E-07	6.19E-06	EPA, 1999	1.22E-04	1.80E-04	1.16E-04	EPA, 1999	4.32E-07	6.19E-06	EPA, 1999	1.22E-04
Lithium	2.41E+01	1.00E+00	2.41E+01	**	1.00E+00	2.41E+01	**	1.00E+00	2.41E+01	**	1.00E+00	2.41E+01	**	1.00E+00	2.41E+01	**	4.83E+01	1.00E+00	2.41E+01	**	1.00E+00	2.41E+01	**	4.83E+01
Manganese	5.07E+02	6.05E-02	3.06E+01	Sample, 199	6.05E-02	3.06E+01	Sample, 199	7.92E-02	4.01E+01	Bechtel, 199	1.00E+00	4.01E+01	**	1.00E+00	5.07E+02	**	5.47E+02	1.00E+00	4.01E+01	**	1.00E+00	5.07E+02	**	5.47E+02
Mercury	2.41E-02	8.50E+00	2.05E-01	Sample, 199	8.50E+00	2.05E-01	Sample, 199	1.37E-01	3.30E-03	Bechtel, 199	4.68E-04	1.55E-06	EPA, 1999	1.12E-06	2.70E-08	Sample, 1998a	1.57E-06	1.59E-03	5.25E-06	EPA, 1999	5.12E-05	1.23E-06	EPA, 1999	6.48E-06
Phenanthrene	6.72E-03	7.00E-02	4.70E-04	EPA, 1999*	7.00E-02	4.70E-04	EPA, 1999*	2.02E-02	1.36E-04	EPA, 1999*	5.31E-02	7.21E-06	EPA, 1999*	1.27E-04	8.53E-07	EPA, 1999*	8.06E-06	3.11E-02	4.22E-06	EPA, 1999*	9.98E-04	6.71E-06	EPA, 1999*	1.09E-05
Pyrene	2.00E-02	7.00E-02	1.40E-03	EPA, 1999*	7.00E-02	1.40E-03	EPA, 1999*	2.02E-02	4.04E-04	EPA, 1999*	5.31E-02	2.15E-05	EPA, 1999*	1.27E-04	2.54E-06	EPA, 1999*	2.40E-05	3.11E-02	1.26E-05	EPA, 1999*	9.98E-04	2.00E-05	EPA, 1999*	3.25E-05
Zinc	7.50E+02	5.60E-01	4.20E+02	EPA, 1999	5.60E-01	4.20E+02	EPA, 1999	1.20E-12	8.99E-10	EPA, 1999	5.39E-05	4.85E-14	EPA, 1999	1.29E-07	9.67E-05	EPA, 1999	9.67E-05	3.89E-03	3.50E-12	EPA, 1999	1.25E-04	9.37E-02	EPA, 1999	9.37E-02
LPAH	6.72E-03	7.00E-02	4.70E-04	EPA, 1999*	7.00E-02	4.70E-04	EPA, 1999*	2.02E-02	1.36E-04	EPA, 1999*	5.31E-02	7.21E-06	EPA, 1999*	1.27E-04	8.53E-07	EPA, 1999*	8.06E-06	3.11E-02	4.22E-06	EPA, 1999*	9.98E-04	6.71E-06	EPA, 1999*	1.09E-05
HPAH	1.47E-01	7.00E-02	1.03E-02	EPA, 1999*	7.00E-02	1.03E-02	EPA, 1999*	2.02E-02	2.98E-03	EPA, 1999*	5.31E-02	1.58E-04	EPA, 1999*	1.27E-04	1.87E-05	EPA, 1999*	1.77E-04	3.11E-02	9.26E-05	EPA, 1999*	9.98E-04	1.47E-04	EPA, 1999*	2.40E-04
TOTAL PAHs	1.54E-01	7.00E-02	1.08E-02	EPA, 1999*	7.00E-02	1.08E-02	EPA, 1999*	2.02E-02	3.11E-03	EPA, 1999*	5.31E-02	1.65E-04	EPA, 1999*	1.27E-04	1.96E-05	EPA, 1999*	1.85E-04	3.11E-02	9.68E-05	EPA, 1999*	9.98E-04	1.54E-04	EPA, 1999*	2.51E-04

Notes:
* For BAFs and BCFs for LPAHs and HPAHs, the most conservative value for the individual PAHs was used to estimated food concentrations.
**If no BAF or BCF was available in the literature, a default value of 1.0 was used per EPA comments (EPA, 2009).

TABLE F-1
EXPOSURE POINT CONCENTATION (mg/kg)
INTRACOASTAL WATERWAY SEDIMENT AND SURFACE WATER

Chemical of Interest[+]	Exposure Point Concentraiton	Statistic Used
SEDIMENT		
2-Methylnaphthalene	< 1.46E-02	median
4,4'-DDT	< 2.03E-04	median
Acenaphthene	< 1.35E-02	median
Anthracene	< 1.78E-02	median
Benzo(a)anthracene	< 1.38E-02	99% Chebyshev
Benzo(a)pyrene	< 1.58E-02	median
Benzo(b)fluoranthene	3.52E-01	97.5% KM (Chebyshev)
Benzo(g,h,i)perylene	< 1.72E-02	median
Benzo(k)fluoranthene	< 2.43E-01	median
Chrysene	2.73E-01	97.5% KM (Chebyshev)
Copper	8.43E+00	95% Student's-t
Dibenz(a,h)anthracene	< 1.57E-02	median
Fluoranthene	4.39E-01	97.5% KM (Chebyshev)
Fluorene	< 1.38E-02	median
gamma-Chlordane	< 3.91E-04	median
Hexachlorobenzene	< 1.62E-02	median
Indeno(1,2,3-cd)pyrene	< 2.53E-02	median
Mercury	2.33E-02	95% Student's-t
Nickel	1.08E+01	95% Student's-t
Phenanthrene	2.80E-01	97.5% KM (Chebyshev)
Pyrene	4.82E-01	97.5% KM (Chebyshev)
Zinc	5.41E+01	95% Student's-t
LPAH	3.40E-01	
HPAH	1.88E+00	
TOTAL PAHs	2.22E+00	
SURFACE WATER[1]		
Acrylonitrile	2.10E-03	EPC is max detect
Aluminum	5.50E-01	EPC is max detect
Barium	2.60E-02	EPC is max detect
Boron	4.81E+00	EPC is max detect
Chromium	1.20E-01	EPC is max detect
Copper	1.10E-02	EPC is max detect
Iron	5.90E-01	EPC is max detect
Lithium	2.70E-01	EPC is max detect
Manganese	4.80E-02	EPC is max detect
Silver	3.70E-03	EPC is max detect
Strontium	7.35E+00	EPC is max detect
Titanium	5.70E-03	EPC is max detect
Vanadium	6.10E-02	EPC is max detect

Notes:

[+] Chemicals of interest are any chemical measured in at least one sample.

(1) - Exposure Point Concentration from Table 3-2 of TCEQ, 2006; only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE F-2
TOXICITY REFERENCE VALUES

Parameter	Polychaetes (mg/kg)	Ref.	Comments	Polychaetes (mg/kg)	Ref.	Comments	Avian Carnivore (Sandpiper) (mg/kgBW-day)	Ref.	Comments	Avian Carnivore (Green heron) (mg/kgBW-day)	Ref.	Comments
2-Methylnaphthalene	7.00E-02	SQUIRT	ERL	6.70E-01	SQUIRT	ERM						
4,4'-DDT	1.00E-03	SQUIRT	ERL	6.29E-02	SQUIRT	ERM	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Acenaphthene	4.40E-02	SQUIRT	ERL	6.40E-01	SQUIRT	ERM						
Anthracene	8.53E-02	SQUIRT	ERL	1.10E+00	SQUIRT	ERM						
Benzo(a)anthracene	2.61E-01	SQUIRT	ERL	1.60E+00	SQUIRT	ERM						
Benzo(a)pyrene	4.30E-01	SQUIRT	ERL	1.60E+00	SQUIRT	ERM						
Benzo(b)fluoranthene	1.80E+00	SQUIRT	AET	1.80E+00	SQUIRT	AET						
Benzo(g,h,i)perylene	6.70E-01	SQUIRT	AET	6.70E-01	SQUIRT	AET						
Benzo(k)fluoranthene	1.80E+00	SQUIRT	AET	1.80E+00	SQUIRT	AET						
Chrysene	3.84E-01	SQUIRT	ERL	2.80E+00	SQUIRT	ERM						
Copper	3.40E+01	SQUIRT	ERL	2.70E+02	SQUIRT	ERM	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Dibenz(a,h)anthracene	6.34E-02	SQUIRT	ERL	2.60E-01	SQUIRT	ERM						
Fluoranthene	6.00E-01	SQUIRT	ERL	5.10E+00	SQUIRT	ERM						
Fluorene	1.90E-02	SQUIRT	ERL	5.40E-01	SQUIRT	ERM						
gamma-Chlordane	2.26E-03	SQUIRT	ERL	4.79E-03	SQUIRT	ERM	2.14E+00	Sample, 1996	Chronic NOAEL in red-winged blackbird	2.14E+00	Sample, 1996	Chronic NOAEL in red-winged blackbird
Hexachlorobenzene	6.00E-03	SQUIRT	AET	6.00E-03	SQUIRT	AET	2.25E-01	EPA, 1999	avian TRV for soil	2.25E-01	EPA, 1999	avian TRV for soil
Indeno(1,2,3-cd)pyrene	6.00E-01	SQUIRT	AET	6.00E-01	SQUIRT	AET						
Mercury	1.50E-01	SQUIRT	ERL	7.10E-01	SQUIRT	ERM	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)
Nickel	2.09E+01	SQUIRT	ERL	5.16E+01	SQUIRT	ERM	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Phenanthrene	2.40E-01	SQUIRT	ERL	1.50E+00	SQUIRT	ERM						
Pyrene	6.65E-01	SQUIRT	ERL	2.60E+00	SQUIRT	ERM						
Zinc	1.50E+02	SQUIRT	ERL	4.10E+02	SQUIRT	ERM	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups
LPAH	5.52E-01	SQUIRT	ERL	3.16E+00	SQUIRT	ERM						
HPAH	1.70E+00	SQUIRT	ERL	9.60E+00	SQUIRT	ERM						
TOTAL PAHs	4.02E+00	SQUIRT	ERL	4.48E+01	SQUIRT	ERM						
Acrylonitrile	-	-	-	-	-	-	-	-		-	-	
Aluminum	-	-	-	-	-	-	1.00E+02	EPA, 1999		1.00E+02	EPA, 1999	
Barium	-	-	-	-	-	-	2.08E+01	EPA, 1999		2.08E+01	EPA, 1999	
Boron	-	-	-	-	-	-	-	-		-	-	
Chromium (VI)	-	-	-	-	-	-	1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Copper	-	-	-	-	-	-	4.70E+01	EPA, 1999		4.70E+01	EPA, 1999	
Iron	-	-	-	-	-	-	-	-		-	-	
Lithium	-	-	-	-	-	-	-	-		-	-	
Manganese	-	-	-	-	-	-	-	-		-	-	
Silver	-	-	-	-	-	-	1.78E+02	EPA, 1999		1.78E+02	EPA, 1999	
Strontium	-	-	-	-	-	-	-	-		-	-	
Titanium	-	-	-	-	-	-	-	-		-	-	
Vanadium	-	-	-	-	-	-	-	-		-	-	

Notes:
ERL -- Effects Range-Low
AET -- Apparent Effects Threshold
EPA, 2007a -- DDT
EPA, 2007b -- PAHs
EPA, 2007c -- Copper
EPA, 2007d -- Nickel
EPA, 2007e -- Zinc

TABLE F-3
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Polychaetes

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Sediment Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table F-2

Chemical	**Exposure Point Concentration* (Sc)**	**TRV polychaetes**	**Maximum EHQ+**
2-Methylnaphthalene	1.88E-02	7.00E-02	2.69E-01
4,4'-DDT	3.32E-03	1.00E-03	3.32E+00
Acenaphthene	6.31E-02	4.40E-02	1.43E+00
Anthracene	7.53E-02	8.53E-02	8.83E-01
Benzo(a)anthracene	3.95E-01	2.61E-01	1.51E+00
Benzo(a)pyrene	4.45E-01	4.30E-01	1.03E+00
Benzo(b)fluoranthene	6.11E-01	1.80E+00	3.39E-01
Benzo(g,h,i)perylene	4.42E-01	6.70E-01	6.60E-01
Benzo(k)fluoranthene	3.18E-01	1.80E+00	1.77E-01
Chrysene	4.75E-01	3.84E-01	1.24E+00
Copper	1.26E+01	3.40E+01	3.71E-01
Dibenz(a,h)anthracene	2.35E-01	6.34E-02	3.71E+00
Fluoranthene	8.04E-01	6.00E-01	1.34E+00
Fluorene	4.60E-02	1.90E-02	2.42E+00
gamma-Chlordane	8.26E-04	2.26E-03	3.65E-01
Hexachlorobenzene	3.19E-02	6.00E-03	5.32E+00
Indeno(1,2,3-cd)pyrene	4.05E-01	6.00E-01	6.75E-01
Mercury	3.60E-02	1.50E-01	2.40E-01
Nickel	1.67E+01	2.09E+01	7.99E-01
Phenanthrene	5.08E-01	2.40E-01	2.12E+00
Pyrene	8.62E-01	6.65E-01	1.30E+00
Zinc	9.26E+01	1.50E+02	6.17E-01
LPAH	7.11E-01	5.52E-01	1.29E+00
HPAH	4.91E+00	1.70E+00	2.89E+00
TOTAL PAHs	5.62E+00	4.02E+00	1.40E+00

Notes:
*EPC for benthic receptors is maximum measured concentration.
+Shading indicates HQ > 1.

TABLE F-4
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (SANDPIPER)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table F-1	
IR	Maximum Ingestion rate of sed (kg/day)***	5.34E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Sc	Intake
2-Methylnaphthalene	1.46E-02	2.29E-06
4,4'-DDT	2.03E-04	3.19E-08
Acenaphthene	1.35E-02	2.12E-06
Anthracene	1.78E-02	2.79E-06
Benzo(a)anthracene	1.38E-02	2.17E-06
Benzo(a)pyrene	1.58E-02	2.48E-06
Benzo(b)fluoranthene	3.52E-01	5.52E-05
Benzo(g,h,i)perylene	1.72E-02	2.70E-06
Benzo(k)fluoranthene	2.43E-01	3.81E-05
Chrysene	2.73E-01	4.28E-05
Copper	8.43E+00	1.32E-03
Dibenz(a,h)anthracene	1.57E-02	2.46E-06
Fluoranthene	4.39E-01	6.89E-05
Fluorene	1.38E-02	2.17E-06
gamma-Chlordane	3.91E-04	6.14E-08
Hexachlorobenzene	1.62E-02	2.54E-06
Indeno(1,2,3-cd)pyrene	2.53E-02	3.97E-06
Mercury	2.33E-02	3.66E-06
Nickel	1.08E+01	1.69E-03
Phenanthrene	2.80E-01	4.39E-05
Pyrene	4.82E-01	7.56E-05
Zinc	5.41E+01	8.49E-03
LPAH	3.40E-01	5.33E-05
HPAH	1.88E+00	2.95E-04
TOTAL PAHs	2.22E+00	3.48E-04

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table F-1	
IR	Maximum Ingestion rate of water (L/day)	7.11E-03	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Wc	Intake
Acrylonitrile	2.10E-03	4.39E-04
Aluminum	5.50E-01	1.15E-01
Barium	2.60E-02	5.44E-03
Boron	4.81E+00	1.01E+00
Chromium	1.20E-01	2.51E-02
Copper	1.10E-02	2.30E-03
Iron	5.90E-01	1.23E-01
Lithium	2.70E-01	5.65E-02
Manganese	4.80E-02	1.00E-02
Silver	3.70E-03	7.74E-04
Strontium	7.35E+00	1.54E+00
Titanium	5.70E-03	1.19E-03
Vanadium	6.10E-02	1.28E-02

TABLE F-4
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (SANDPIPER)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFw * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table F-8	
Cw	Worm concentration (mg/kg)	see Table F-8	
IR	Maximum Ingestion rate of of food (kg/day)***	2.81E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	4.00E-01	prof. judgement
Dfw	Dietary fraction of worms (unitless)	6.00E-01	prof. judgement
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Crab	Worm	Intake
2-Methylnaphthalene	1.46E-02	2.35E-02	1.65E-05
4,4'-DDT	2.98E-03	1.62E-04	1.06E-06
Acenaphthene	1.35E-02	2.17E-02	1.52E-05
Anthracene	5.82E-02	2.87E-02	3.34E-05
Benzo(a)anthracene	2.92E-01	2.00E-02	1.06E-04
Benzo(a)pyrene	1.80E-01	2.51E-02	7.18E-05
Benzo(b)fluoranthene	2.29E-01	5.67E-01	3.57E-04
Benzo(g,h,i)perylene	1.72E-02	2.77E-02	1.94E-05
Benzo(k)fluoranthene	1.96E-01	3.91E-01	2.59E-04
Chrysene	1.49E-01	3.77E-01	2.36E-04
Copper	8.43E+00	2.53E+00	4.04E-03
Dibenz(a,h)anthracene	2.47E-01	2.53E-02	9.41E-05
Fluoranthene	4.39E-01	7.07E-01	4.95E-04
Fluorene	1.38E-02	2.22E-02	1.56E-05
gamma-Chlordane	8.99E-04	2.30E-03	1.44E-06
Hexachlorobenzene	2.90E-01	8.29E-03	9.99E-05
Indeno(1,2,3-cd)pyrene	1.18E-01	4.07E-02	5.90E-05
Mercury	1.40E-03	9.32E-03	5.08E-06
Nickel	5.83E-01	9.71E+00	5.01E-03
Phenanthrene	2.80E-01	4.51E-01	3.16E-04
Pyrene	4.82E-01	7.76E-01	5.44E-04
Zinc	6.16E+01	3.08E+01	3.56E-02
LPAH	1.77E+02	5.47E-01	5.87E-02
HPAH	1.11E+00	3.02E+00	1.86E-03
TOTAL PAHs	6.14E+00	3.57E+00	3.80E-03
Acrylonitrile	0.00E+00	2.31E-04	1.14E-07
Aluminum	0.00E+00	2.24E+03	1.11E+00
Barium	0.00E+00	5.20E+00	2.58E-03
Boron	0.00E+00	4.81E+00	2.38E-03
Chromium	0.00E+00	3.60E+02	1.78E-01
Copper	0.00E+00	4.09E+01	2.03E-02
Iron	0.00E+00	5.90E-01	2.92E-04
Lithium	0.00E+00	2.70E-01	1.34E-04
Manganese	0.00E+00	4.80E-02	2.38E-05
Silver **	1.100E-01	1.10E+00	5.83E-04
Strontium	0.00E+00	7.35E+00	3.64E-03
Titanium	0.00E+00	5.70E-03	2.83E-06
Vanadium	0.00E+00	6.10E-02	3.02E-05

TABLE F-4
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (SANDPIPER)

TOTAL INTAKE

INTAKE = Sediment Intake + Surface Water Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.88E-05
4,4'-DDT	1.10E-06
Acenaphthene	1.74E-05
Anthracene	3.62E-05
Benzo(a)anthracene	1.09E-04
Benzo(a)pyrene	7.42E-05
Benzo(b)fluoranthene	4.12E-04
Benzo(g,h,i)perylene	2.21E-05
Benzo(k)fluoranthene	2.97E-04
Chrysene	2.79E-04
Copper *	7.66E-03
Dibenz(a,h)anthracene	9.66E-05
Fluoranthene	5.64E-04
Fluorene	1.77E-05
gamma-Chlordane	1.50E-06
Hexachlorobenzene	1.02E-04
Indeno(1,2,3-cd)pyrene	6.30E-05
Mercury	8.74E-06
Nickel	6.70E-03
Phenanthrene	3.60E-04
Pyrene	6.20E-04
Zinc	4.41E-02
LPAH	5.87E-02
HPAH	2.16E-03
TOTAL PAHs	4.14E-03
Acrylonitrile	4.39E-04
Aluminum	1.22E+00
Barium	8.01E-03
Boron	1.01E+00
Chromium	2.04E-01
Copper *	-
Iron	1.24E-01
Lithium	5.66E-02
Manganese	1.01E-02
Silver **	1.36E-03
Strontium	1.54E+00
Titanium	1.19E-03
Vanadium	1.28E-02

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.
** COPEC was measured in crab tissue and water, but not in sediment.

TABLE F-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (GREEN HERON)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table F-1	
IR	Maximum Ingestion rate of sed (kg/day)***	1.88E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Sc	Intake
2-Methylnaphthalene	1.46E-02	1.55E-07
4,4'-DDT	2.03E-04	2.16E-09
Acenaphthene	1.35E-02	1.43E-07
Anthracene	1.78E-02	1.89E-07
Benzo(a)anthracene	1.38E-02	1.47E-07
Benzo(a)pyrene	1.58E-02	1.68E-07
Benzo(b)fluoranthene	3.52E-01	3.74E-06
Benzo(g,h,i)perylene	1.72E-02	1.83E-07
Benzo(k)fluoranthene	2.43E-01	2.58E-06
Chrysene	2.73E-01	2.90E-06
Copper	8.43E+00	8.94E-05
Dibenz(a,h)anthracene	1.57E-02	1.67E-07
Fluoranthene	4.39E-01	4.66E-06
Fluorene	1.38E-02	1.47E-07
gamma-Chlordane	3.91E-04	4.15E-09
Hexachlorobenzene	1.62E-02	1.72E-07
Indeno(1,2,3-cd)pyrene	2.53E-02	2.69E-07
Mercury	2.33E-02	2.47E-07
Nickel	1.08E+01	1.15E-04
Phenanthrene	2.80E-01	2.97E-06
Pyrene	4.82E-01	5.12E-06
Zinc	5.41E+01	5.74E-04
LPAH	3.40E-01	3.61E-06
HPAH	1.88E+00	1.99E-05
TOTAL PAHs	2.22E+00	2.35E-05

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table F-1	
IR	Maximum Ingestion rate of water (L/day)	2.09E-02	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Wc	Intake
Acrylonitrile	2.10E-03	2.48E-04
Aluminum	5.50E-01	6.49E-02
Barium	2.60E-02	3.07E-03
Boron	4.81E+00	5.67E-01
Chromium	1.20E-01	1.42E-02
Copper	1.10E-02	1.30E-03
Iron	5.90E-01	6.96E-02
Lithium	2.70E-01	3.19E-02
Manganese	4.80E-02	5.66E-03
Silver	3.70E-03	4.37E-04
Strontium	7.35E+00	8.67E-01
Titanium	5.70E-03	6.72E-04
Vanadium	6.10E-02	7.20E-03

TABLE F-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (GREEN HERON)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFw * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table F-8	
Cw	Worm concentration (mg/kg)	see Table F-8	
IR	Maximum Ingestion rate of of food (kg/day)***	9.40E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	2.50E-01	Kent, 1986
Dff	Dietary fraction of fish (unitless)	7.50E-01	Kent, 1986
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Crab	Fish	Intake
2-Methylnaphthalene	1.46E-02	6.79E-02	2.90E-05
4,4'-DDT	2.98E-03	1.18E-04	4.42E-07
Acenaphthene	1.35E-02	6.68E-03	4.45E-06
Anthracene	5.82E-02	1.50E-03	8.32E-06
Benzo(a)anthracene	2.92E-01	9.11E-03	4.24E-05
Benzo(a)pyrene	1.80E-01	1.04E-02	2.80E-05
Benzo(b)fluoranthene	2.29E-01	2.32E-01	1.23E-04
Benzo(g,h,i)perylene	1.72E-02	1.14E-02	6.80E-06
Benzo(k)fluoranthene	1.96E-01	1.60E-01	8.99E-05
Chrysene	1.49E-01	1.80E-01	9.15E-05
Copper	8.43E+00	8.43E+00	4.47E-03
Dibenz(a,h)anthracene	2.47E-01	1.04E-02	3.69E-05
Fluoranthene	4.39E-01	2.90E-01	1.74E-04
Fluorene	1.38E-02	6.83E-03	4.55E-06
gamma-Chlordane	8.99E-04	5.87E-04	3.53E-07
Hexachlorobenzene	2.90E-01	2.30E-02	4.76E-05
Indeno(1,2,3-cd)pyrene	1.18E-01	1.67E-02	2.22E-05
Mercury	1.40E-03	7.53E-02	3.01E-05
Nickel	5.83E-01	5.83E-01	3.09E-04
Phenanthrene	2.80E-01	1.39E-01	9.23E-05
Pyrene	4.82E-01	3.18E-01	1.91E-04
Zinc	6.16E+01	6.16E+01	3.27E-02
LPAH	1.77E+02	1.68E-01	2.35E-02
HPAH	1.11E+00	1.24E+00	6.41E-04
TOTAL PAHs	6.14E+00	1.46E+00	1.40E-03
Acrylonitrile	0.00E+00	1.01E-01	4.01E-05
Aluminum	0.00E+00	1.49E+00	5.91E-04
Barium	0.00E+00	1.65E+01	6.55E-03
Boron	0.00E+00	4.81E+00	1.92E-03
Chromium	0.00E+00	2.28E+00	9.08E-04
Copper	0.00E+00	7.81E+00	3.11E-03
Iron	0.00E+00	5.90E-01	2.35E-04
Lithium	0.00E+00	2.70E-01	1.07E-04
Manganese	0.00E+00	4.80E-02	1.91E-05
Silver **	1.10E-01	3.25E-01	1.46E-05
Strontium	0.00E+00	7.35E+00	2.93E-03
Titanium	0.00E+00	5.70E-03	2.27E-06
Vanadium	0.00E+00	6.10E-02	2.43E-05

TABLE F-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (GREEN HERON)

TOTAL INTAKE

INTAKE = Sediment Intake + Surface Water Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	2.91E-05
4,4'-DDT	4.44E-07
Acenaphthene	4.60E-06
Anthracene	8.51E-06
Benzo(a)anthracene	4.25E-05
Benzo(a)pyrene	2.81E-05
Benzo(b)fluoranthene	1.27E-04
Benzo(g,h,i)perylene	6.98E-06
Benzo(k)fluoranthene	9.24E-05
Chrysene	9.44E-05
Copper *	5.86E-03
Dibenz(a,h)anthracene	3.71E-05
Fluoranthene	1.78E-04
Fluorene	4.70E-06
gamma-Chlordane	3.57E-07
Hexachlorobenzene	4.78E-05
Indeno(1,2,3-cd)pyrene	2.25E-05
Mercury	3.04E-05
Nickel	4.24E-04
Phenanthrene	9.53E-05
Pyrene	1.96E-04
Zinc	3.33E-02
LPAH	2.35E-02
HPAH	6.61E-04
TOTAL PAHs	1.42E-03
Acrylonitrile	2.48E-04
Aluminum	6.49E-02
Barium	3.07E-03
Boron	5.67E-01
Chromium	1.42E-02
Copper *	-
Iron	6.96E-02
Lithium	3.19E-02
Manganese	5.66E-03
Silver **	4.51E-04
Strontium	8.67E-01
Titanium	6.72E-04
Vanadium	7.20E-03

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.
** COPEC was measured in crab tissue and water, but not in sediment.
***Expressed in dry weight.

TABLE F-6
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (SANDPIPER)

Ecological Hazard Quotient = Total Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table F-2

Chemical	Total Intake	TRV Sandpiper		EHQ
2-Methylnaphthalene	1.88E-05			
4,4'-DDT	1.10E-06	2.27E-01	<	4.83E-06
Acenaphthene	1.74E-05			
Anthracene	3.62E-05			
Benzo(a)anthracene	1.09E-04			
Benzo(a)pyrene	7.42E-05			
Benzo(b)fluoranthene	4.12E-04			
Benzo(g,h,i)perylene	2.21E-05			
Benzo(k)fluoranthene	2.97E-04			
Chrysene	2.79E-04			
Copper *	7.66E-03	4.05E+00		1.89E-03
Dibenz(a,h)anthracene	9.66E-05			
Fluoranthene	5.64E-04			
Fluorene	1.77E-05			
gamma-Chlordane	1.50E-06	2.14E+00	<	7.00E-07
Hexachlorobenzene	1.02E-04	2.25E-01	<	4.55E-04
Indeno(1,2,3-cd)pyrene	6.30E-05			
Mercury	8.74E-06	3.25E+00		2.69E-06
Nickel	6.70E-03	6.71E+00		9.98E-04
Phenanthrene	3.60E-04			
Pyrene	6.20E-04			
Zinc	4.41E-02	6.61E+01		6.68E-04
LPAH	5.87E-02			
HPAH	2.16E-03			
TOTAL PAHs	4.14E-03			
Acrylonitrile	4.39E-04			
Aluminum	1.22E+00	1.00E+02		1.22E-02
Barium	8.01E-03	2.08E+01		3.85E-04
Boron	1.01E+00			
Chromium	2.04E-01	1.00E+00		2.04E-01
Copper	-	-		-
Iron	1.24E-01			
Lithium	5.66E-02			
Manganese	1.01E-02			
Silver	1.36E-03	1.78E+02		7.62E-06
Strontium	1.54E+00			
Titanium	1.19E-03			
Vanadium	1.28E-02			

NOTES:
* Total Intake for the COPEC includes surface water exposure pathway.

TABLE F-7
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Avian Carnivore (GREEN HERON)

Ecological Hazard Quotient = Total Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table F-2

Chemical	Total Intake	TRV Green Heron		EHQ
2-Methylnaphthalene	2.91E-05			
4,4'-DDT	4.44E-07	2.27E-01	<	1.96E-06
Acenaphthene	4.60E-06			
Anthracene	8.51E-06			
Benzo(a)anthracene	4.25E-05			
Benzo(a)pyrene	2.81E-05			
Benzo(b)fluoranthene	1.27E-04			
Benzo(g,h,i)perylene	6.98E-06			
Benzo(k)fluoranthene	9.24E-05			
Chrysene	9.44E-05			
Copper *	5.86E-03	4.05E+00		1.45E-03
Dibenz(a,h)anthracene	3.71E-05			
Fluoranthene	1.78E-04			
Fluorene	4.70E-06			
gamma-Chlordane	3.57E-07	2.14E+00	<	1.67E-07
Hexachlorobenzene	4.78E-05	2.25E-01	<	2.13E-04
Indeno(1,2,3-cd)pyrene	2.25E-05			
Mercury	3.04E-05	3.25E+00		9.35E-06
Nickel	4.24E-04	6.71E+00		6.32E-05
Phenanthrene	9.53E-05			
Pyrene	1.96E-04			
Zinc	3.33E-02	6.61E+01		5.04E-04
LPAH	2.35E-02			
HPAH	6.61E-04			
TOTAL PAHs	1.42E-03			
Acrylonitrile	2.48E-04			
Aluminum	6.49E-02	1.00E+02		6.49E-04
Barium	3.07E-03	2.08E+01		1.47E-04
Boron	5.67E-01			
Chromium	1.42E-02	1.00E+00		1.42E-02
Copper	-	-		-
Iron	6.96E-02			
Lithium	3.19E-02			
Manganese	5.66E-03			
Silver	4.51E-04	1.78E+02		2.53E-06
Strontium	8.67E-01			
Titanium	6.72E-04			
Vanadium	7.20E-03			

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.

TABLE F-8
CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg)

Cfood = Csed x BSAF or Cwtr x BCF

where:

Cfood =	Chemical Concentration in food (mg/kg dry)
Csed =	Chemical Concentration in sediment (mg/kg dry)
Cwtr =	Chemical Concentration in water (mg/L)
BCF =	Bioconcentration Factor (unitless)

Compound	Csed (mg/kg)	Sediment to Worm BSAF	Worm Concentration	Reference	Sediment to Crab BSAF	Crab Concentration	Reference	Sediment to Fish BSAF	Fish Concentration	Reference
2-Methylnaphthalene	1.46E-02	1.61E+00	2.35E-02	EPA, 1999	1.00E+00	1.46E-02	**	4.65E+00	6.79E-02	Brunson et al. (1998)
4,4'-DDT	2.03E-04	8.00E-01	1.62E-04	BSAF DB	*	2.98E-03	*	5.80E-01	1.18E-04	WSDOH, 1995
Acenaphthene	1.35E-02	1.61E+00	2.17E-02	EPA, 1999	1.00E+00	1.35E-02	**	4.950E-01	6.68E-03	WSDOH, 1995
Anthracene	1.78E-02	1.61E+00	2.87E-02	EPA, 1999	3.27E+00	5.82E-02	BSAF DB	8.40E-02	1.50E-03	WSDOH, 1995
Benzo(a)anthracene	1.38E-02	1.45E+00	2.00E-02	EPA, 1999	*	2.92E-01	*	6.60E-01	9.11E-03	WSDOH, 1995
Benzo(a)pyrene	1.58E-02	1.59E+00	2.51E-02	EPA, 1999	*	1.80E-01	*	6.60E-01	1.04E-02	WSDOH, 1995
Benzo(b)fluoranthene	3.52E-01	1.61E+00	5.67E-01	EPA, 1999	*	2.29E-01	*	6.60E-01	2.32E-01	WSDOH, 1995
Benzo(g,h,i)perylene	1.72E-02	1.61E+00	2.77E-02	EPA, 1999	1.00E+00	1.72E-02	**	6.60E-01	1.14E-02	WSDOH, 1995
Benzo(k)fluoranthene	2.43E-01	1.61E+00	3.91E-01	EPA, 1999	*	1.96E-01	*	6.60E-01	1.60E-01	WSDOH, 1995
Chrysene	2.73E-01	1.38E+00	3.77E-01	EPA, 1999	*	1.49E-01	*	6.60E-01	1.80E-01	WSDOH, 1995
Copper	8.43E+00	3.00E-01	2.53E+00	EPA, 2002	1.00E+00	8.43E+00	**	1.00E+00	8.43E+00	Max value from Calcasieu RI
Dibenz(a,h)anthracene	1.57E-02	1.61E+00	2.53E-02	EPA, 1999	*	2.47E-01	*	6.60E-01	1.04E-02	WSDOH, 1995
Fluoranthene	4.39E-01	1.61E+00	7.07E-01	EPA, 1999	1.00E+00	4.39E-01	**	6.60E-01	2.90E-01	WSDOH, 1995
Fluorene	1.38E-02	1.61E+00	2.22E-02	EPA, 1999	1.00E+00	1.38E-02	**	4.95E-01	6.83E-03	WSDOH, 1995
gamma-Chlordane	3.91E-04	5.88E+00	2.30E-03	BSAF DB	2.30E+00	8.99E-04	BSAF DB	1.50E+00	5.87E-04	BSAF DB
Hexachlorobenzene	1.62E-02	5.12E-01	8.29E-03	BSAF DB	*	2.90E-01	*	1.42E+00	2.30E-02	Max value from Calcasieu RI
Indeno(1,2,3-cd)pyrene	2.53E-02	1.61E+00	4.07E-02	EPA, 1999	*	1.18E-01	*	6.60E-01	1.67E-02	WSDOH, 1995
Mercury	2.33E-02	4.00E-01	9.32E-03	EPA, 1999	6.00E-02	1.40E-03	Max value from Calcasieu RI	3.23E+00	7.53E-02	Max value from Calcasieu RI
Nickel	1.08E+01	9.00E-01	9.71E+00	EPA, 1999	5.40E-02	5.83E-01	Max value from Calcasieu RI	5.40E-02	5.83E-01	Max value from Calcasieu RI
Phenanthrene	2.80E-01	1.61E+00	4.51E-01	EPA, 1999	1.00E+00	2.80E-01	**	4.95E-01	1.39E-01	WSDOH, 1995
Pyrene	4.82E-01	1.61E+00	7.76E-01	EPA, 1999	1.00E+00	4.82E-01	**	6.60E-01	3.18E-01	WSDOH, 1995
Silver	-	-	-	-		1.10E-01		-	-	-
Zinc	5.41E+01	5.70E-01	3.08E+01	EPA, 1999	1.14E+00	6.16E+01	Max value from Calcasieu RI	1.14E+00	6.16E+01	Max value from Calcasieu RI
LPAH	3.40E-01	1.61E+00	5.47E-01	EPA, 1999	3.27E+00	1.77E+02	max PAH	4.96E-01	1.68E-01	WSDOH, 1995
HPAH	1.88E+00	1.61E+00	3.02E+00	EPA, 1999	3.27E+00	1.11E+00	max PAH	6.60E-01	1.24E+00	WSDOH, 1995
TOTAL PAHs	2.22E+00	1.61E+00	3.57E+00	EPA, 1999	3.27E+00	6.14E+00	max PAH	6.60E-01	1.46E+00	WSDOH, 1995

Compound	Cwtr (mg/kg)	Water to Worm BCF	Worm Concentration	Reference	Water to Crab BCF	Crab Concentration	Reference	Water to Fish BCF	Fish Concentration	Reference
Acrylonitrile	2.10E-03	1.10E-01	2.31E-04	EPA, 1999	-	0.00E+00	*+	4.80E+01	1.01E-01	EPA, 1999
Aluminum	5.50E-01	4.07E+03	2.24E+03	EPA, 1999	-	0.00E+00	*+	2.70E+00	1.49E+00	EPA, 1999
Barium	2.60E-02	2.00E+02	5.20E+00	EPA, 1999	-	0.00E+00	*+	6.33E+02	1.65E+01	EPA, 1999
Boron	4.81E+00	1.00E+00	4.81E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	4.81E+00	EPA, 1997
Chromium	1.20E-01	3.00E+03	3.60E+02	EPA, 1999	-	0.00E+00	*+	1.90E+01	2.28E+00	EPA, 1999
Copper	1.10E-02	3.72E+03	4.09E+01	EPA, 1999	-	0.00E+00	*+	7.10E+02	7.81E+00	EPA, 1999
Iron	5.90E-01	1.00E+00	5.90E-01	EPA, 1997	-	0.00E+00	*+	1.00E+00	5.90E-01	EPA, 1997
Lithium	2.70E-01	1.00E+00	2.70E-01	EPA, 1997	-	0.00E+00	*+	1.00E+00	2.70E-01	EPA, 1997
Manganese	4.80E-02	1.00E+00	4.80E-02	EPA, 1997	-	0.00E+00	*+	1.00E+00	4.80E-02	EPA, 1997
Silver	3.70E-03	2.98E+02	1.10E+00	EPA, 1999	-	-	already accounted for above	8.77E+01	3.25E-01	EPA, 1999
Strontium	7.35E+00	1.00E+00	7.35E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	7.35E+00	EPA, 1997
Titanium	5.70E-03	1.00E+00	5.70E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	5.70E-03	EPA, 1997
Vanadium	6.10E-02	1.00E+00	6.10E-02	EPA, 1997	-	0.00E+00	*+	1.00E+00	6.10E-02	EPA, 1997

Notes:
* These compounds were analyzed but not detected in any blue crab samples collected at the Site; so value is one-half of maximum detection limit.
*+ These compounds were not included in crab tissue analysis per the approved Sampling & Analysis Plan.
** If no BAF or BCF was available in the literature, a default value of 1.0 was used.

CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg)

Cfood = Csed x BSAF or Cwtr x BCF

where:

Cfood =	Chemical Concentration in food (mg/kg dry)
Csed =	Chemical Concentration in sediment (mg/kg dry)
Cwtr =	Chemical Concentration in water (mg/L)
BCF =	Bioconcentration Factor (unitless)

Compound	Csed (mg/kg)	Sediment to Worm BSAF	Worm Concentration	Reference	Sediment to Crab BSAF	Crab Concentration	Reference	Sediment to Fish BSAF	Fish Concentration	Reference

*** COPEC was measured in crab tissue and surface water, but not in sediment.

TABLE F-9
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT
Polychaetes -- COMPARED WITH MIDPOINT BETWEEN ERLs and ERMs

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Sediment Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table F-2

Chemical	**Exposure Point Concentration* (Sc)**	**TRV polychaete**	**Maximum EHQ+**
2-Methylnaphthalene	1.88E-02	3.70E-01	5.08E-02
4,4'-DDT	3.32E-03	3.20E-02	1.04E-01
Acenaphthene	6.31E-02	3.42E-01	1.85E-01
Anthracene	7.53E-02	5.93E-01	1.27E-01
Benzo(a)anthracene	3.95E-01	9.31E-01	4.25E-01
Benzo(a)pyrene	4.45E-01	1.02E+00	4.38E-01
Benzo(b)fluoranthene	6.11E-01	1.80E+00	3.39E-01
Benzo(g,h,i)perylene	4.42E-01	6.70E-01	6.60E-01
Benzo(k)fluoranthene	3.18E-01	1.80E+00	1.77E-01
Chrysene	4.75E-01	1.59E+00	2.98E-01
Copper	1.26E+01	1.52E+02	8.29E-02
Dibenz(a,h)anthracene	2.35E-01	1.62E-01	1.45E+00
Fluoranthene	8.04E-01	2.85E+00	2.82E-01
Fluorene	4.60E-02	2.80E-01	1.65E-01
gamma-Chlordane	8.26E-04	3.53E-03	2.34E-01
Hexachlorobenzene	3.19E-02	6.00E-03	5.32E+00
Indeno(1,2,3-cd)pyrene	4.05E-01	6.00E-01	6.75E-01
Mercury	3.60E-02	4.30E-01	8.37E-02
Nickel	1.67E+01	3.63E+01	4.61E-01
Phenanthrene	5.08E-01	8.70E-01	5.84E-01
Pyrene	8.62E-01	1.63E+00	5.28E-01
Zinc	9.26E+01	2.80E+02	3.31E-01
LPAH	7.70E-01	1.86E+00	4.15E-01
HPAH	4.91E+00	5.65E+00	8.69E-01
TOTAL PAHs	5.62E+00	2.44E+01	2.30E-01

Notes:
*EPC for benthic receptors is maximum measured concentration.
+Shading indicates HQ > 1.

TABLE G-1
EXPOSURE POINT CONCENTRATION (mg/kg)
SEDIMENT AND SURFACE WATER -- BACKGROUND DATA

Chemical of Interest+	Exposure Point Concentration	Statistic Used
SEDIMENT		
4,4'-DDT	< 2.10E-04	median
Arsenic	7.74E+00	95% Student's-t
Benzo(b)fluoranthene	< 1.09E-02	median
Copper	1.13E+01	95% Student's-t
Mercury	3.68E-02	95% Chebyshev
Nickel	1.99E+01	95% Student's-t
Zinc	4.45E+01	95% Student's-t
HPAH	1.09E-02	
TOTAL PAHs	1.09E-02	
SURFACE WATER [1]		
4,4'-DDD	7.62E-06	EPC is max detect
4,4'-DDT	1.30E-05	EPC is max detect
Acetone	4.52E-03	EPC is max detect
Aldrin	1.10E-05	EPC is max detect
Aluminum	4.00E-01	EPC is max detect
Barium	2.00E-02	EPC is max detect
Benzo(g,h,i)perylene	2.02E-04	EPC is max detect
Benzo(k)fluoranthene	3.11E-04	EPC is max detect
Bis(ethylhexyl) Phthalate	1.97E-02	EPC is max detect
Boron	4.50E+00	EPC is max detect
Chromium	7.90E-02	EPC is max detect
Chromium VI	1.10E-02	EPC is max detect
Chrysene	3.68E-04	EPC is max detect
Di-n-butyl Phthalate	1.42E-03	EPC is max detect
Di-n-octyl Phthalate	6.50E-04	EPC is max detect
Iron	4.30E-01	EPC is max detect
Lithium	3.40E-01	EPC is max detect
Manganese	4.10E-02	EPC is max detect
Methoxyclor	1.40E-05	EPC is max detect
Molybdenum	4.20E-03	EPC is max detect
Silver	5.90E-03	EPC is max detect
Strontium	8.31E+00	EPC is max detect
Titanium	4.20E-03	EPC is max detect
Vanadium	3.70E-02	EPC is max detect
LPAHs++		
HPAHs	8.81E-04	
Total PAHs	4.55E-04	

Notes:

* Low molecular weight PHAs were not measured in sediment samples collected Intracoastal Waterway.

\+ Chemicals of interest are any chemical measured in at least one sample.

++ No LPAHs were detected in the samples.

(1) - Exposure Point Concentration from Table 3-2 of TCEQ, 2006; only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE G-2
TOXICITY REFERENCE VALUES

Parameter	Polychaetes (mg/kg)	Ref.	Comments	Avian Carnivore (Sandpiper) (mg/kgBW-day)	Ref.	Comments	Avian Carnivore (Green heron) (mg/kgBW-day)	Ref.	Comments
4,4'-DDT	1.19E-03	SQUIRT	ERL	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Arsenic	8.20E+00	SQUIRT	ERL	2.46E+00	EPA, 1999		2.46E+00	EPA, 1999	
Benzo(b)fluoranthene	1.80E+00	SQUIRT	AET						
Copper	3.40E+01	SQUIRT	ERL	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Mercury	1.50E-01	SQUIRT	ERL	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)
Nickel	2.09E+01	SQUIRT	ERL	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Zinc	1.50E+02	SQUIRT	ERL	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups
HPAH	1.70E+00	SQUIRT	ERL						
TOTAL PAHs	4.02E+00	SQUIRT	ERL						
4,4'-DDD				8.45E+02	EPA, 1999		8.45E+02	EPA, 1999	
4,4'-DDT	1.00E-03	SQUIRT	ERL	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Acetone				5.20E+04	EPA, 1999		5.20E+04	EPA, 1999	
Aldrin									
Aluminum				1.00E+02	EPA, 1999		1.00E+02	EPA, 1999	
Barium				2.08E+01	EPA, 1999		2.08E+01	EPA, 1999	
Benzo(g,h,i)perylene									
Benzo(k)fluoranthene				1.40E-01	EPA, 1999		1.40E-01	EPA, 1999	
Bis(ethylhexyl) Phthalate				1.11E+02	EPA, 1999		1.11E+02	EPA, 1999	
Boron									
Chromium				1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Chromium VI				1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Chrysene				1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Di-n-butyl Phthalate				1.11E+02	EPA, 1999		1.11E+02	EPA, 1999	
Di-n-octyl Phthalate				1.11E+02	EPA, 1999		1.11E+02	EPA, 1999	
Iron									
Lithium									
Manganese									
Methoxyclor									
Molybdenum									
Silver				1.78E+02	EPA, 1999		1.78E+02	EPA, 1999	
Strontium									
Titanium									
Vanadium									
LPAHs++				-	-		-	-	
HPAHs				-	-		-	-	
Total PAHs				-	-		-	-	

Notes:
ERL -- Effects Range-Low
AET -- Apparent Effects Threshold
EPA, 2007a -- DDT
EPA, 2007b -- PAHs
EPA, 2007c -- Copper
EPA, 2007d -- Nickel
EPA, 2007e -- Zinc

TABLE G-3
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT BACKGROUND
Polychaetes

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Sediment Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table G-2

Chemical	**Exposure Point Concentration* (Sc)**	**TRV Polychaetes**	**Maximum EHQ+**
4,4'-DDT	5.70E-04	1.19E-03	4.79E-01
Arsenic	9.62E+00	8.20E+00	1.17E+00
Benzo(b)fluoranthene	3.69E-02	1.80E+00	2.05E-02
Copper	1.68E+01	3.40E+01	4.94E-01
Mercury	5.00E-02	1.50E-01	3.33E-01
Nickel	2.73E+01	2.09E+01	1.31E+00
Zinc	5.41E+01	1.50E+02	3.61E-01
HPAH	3.69E-02	1.70E+00	2.17E-02
TOTAL PAHs	3.69E-02	4.02E+00	9.17E-03

Notes:
*EPC for benthic receptors is maximum measured concentration.
+Shading indicates HQ > 1.

TABLE G-4
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (SANDPIPER)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table G-1	
IR	Maximum Ingestion rate of sed (kg/day)***	5.34E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	EPC Sc	Intake
4,4'-DDT	2.10E-04	3.30E-08
Arsenic	7.74E+00	1.21E-03
Benzo(b)fluoranthene	1.09E-02	1.71E-06
Copper	1.13E+01	1.78E-03
Mercury	3.68E-02	5.78E-06
Nickel	1.99E+01	3.13E-03
Zinc	4.45E+01	6.99E-03
HPAH	1.09E-02	1.71E-06
TOTAL PAHs	1.09E-02	1.71E-06

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table G-1	
IR	Maximum Ingestion rate of water (L/day)	7.11E-03	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Wc	Intake
4,4'-DDD	7.62E-06	1.59E-06
4,4'-DDT	1.30E-05	2.72E-06
Acetone	4.52E-03	9.45E-04
Aldrin	1.10E-05	2.30E-06
Aluminum	4.00E-01	8.36E-02
Barium	2.00E-02	4.18E-03
Benzo(g,h,i)perylene	2.02E-04	4.22E-05
Benzo(k)fluoranthene	3.11E-04	6.50E-05
Bis(ethylhexyl) Phthalate	1.97E-02	4.12E-03
Boron	4.50E+00	9.41E-01
Chromium	7.90E-02	1.65E-02
Chromium VI	1.10E-02	2.30E-03
Chrysene	3.68E-04	7.70E-05
Di-n-butyl Phthalate	1.42E-03	2.97E-04
Di-n-octyl Phthalate	6.50E-04	1.36E-04
Iron	4.30E-01	8.99E-02
Lithium	3.40E-01	7.11E-02
Manganese	4.10E-02	8.57E-03
Methoxyclor	1.40E-05	2.93E-06
Molybdenum	4.20E-03	8.78E-04
Silver	5.90E-03	1.23E-03
Strontium	8.31E+00	1.74E+00
Titanium	4.20E-03	8.78E-04
Vanadium	3.70E-02	7.74E-03
LPAHs++	0.00E+00	0.00E+00
HPAHs	8.81E-04	1.84E-04
Total PAHs	4.55E-04	9.51E-05

TABLE G-4
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (SANDPIPER)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFw * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table G-8	
Cw	Worm concentration (mg/kg)	see Table G-8	
IR	Maximum Ingestion rate of food (kg/day)***	2.81E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	4.00E-01	prof. judgement
Dfw	Dietary fraction of worms (unitless)	6.00E-01	prof. judgement
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Crab	Worm	Intake
4,4'-DDT	2.98E-03	1.68E-04	1.07E-06
Arsenic	7.74E+00	6.97E+00	6.01E-03
Benzo(b)fluoranthene	2.34E-01	1.75E-02	8.59E-05
Copper	1.13E+01	3.40E+00	5.43E-03
Mercury	2.21E-03	1.47E-02	8.03E-06
Nickel	1.08E+00	1.79E+01	9.25E-03
Zinc	5.08E+01	2.54E+01	2.93E-02
HPAH	3.56E-02	1.75E-02	2.05E-05
TOTAL PAHs	3.56E-02	1.75E-02	2.05E-05
4,4'-DDD	9.09E-02	9.09E-02	7.51E-05
4,4'-DDT	-	-	-
Acetone	2.26E-04	2.26E-04	1.87E-07
Aldrin	1.10E-05	1.10E-05	9.09E-09
Aluminum	1.63E+03	1.63E+03	1.34E+00
Barium	4.00E+00	4.00E+00	3.30E-03
Benzo(g,h,i)perylene	2.02E-04	2.02E-04	1.67E-07
Benzo(k)fluoranthene	4.11E+00	4.11E+00	3.40E-03
Bis(ethylhexyl) Phthalate	6.26E+00	6.26E+00	5.17E-03
Boron	4.50E+00	4.50E+00	3.72E-03
Chromium	2.37E+02	2.37E+02	1.96E-01
Chromium VI	3.30E+01	3.30E+01	2.73E-02
Chrysene	3.61E-01	3.61E-01	2.98E-04
Di-n-butyl Phthalate	8.44E+00	8.44E+00	6.97E-03
Di-n-octyl Phthalate	3.86E+00	3.86E+00	3.19E-03
Iron	4.30E-01	4.30E-01	3.55E-04
Lithium	3.40E-01	3.40E-01	2.81E-04
Manganese	4.10E-02	4.10E-02	3.39E-05
Methoxyclor	1.40E-05	1.40E-05	1.16E-08
Molybdenum	4.20E-03	4.20E-03	3.47E-06
Silver	5.30E-02	1.76E+00	8.89E-04
Strontium	8.31E+00	8.31E+00	6.86E-03
Titanium	4.20E-03	4.20E-03	3.47E-06
Vanadium	3.70E-02	3.70E-02	3.06E-05
LPAHs++	0.00E+00	0.00E+00	0.00E+00
HPAHs	-	-	-
Total PAHs	-	-	-

TABLE G-4
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (SANDPIPER)

TOTAL INTAKE

INTAKE = Sediment Intake + Water Intake + Food Intake

Chemical	Total Intake
4,4'-DDT *	3.82E-06
Arsenic	7.22E-03
Benzo(b)fluoranthene	8.76E-05
Copper	7.21E-03
Mercury	1.38E-05
Nickel	1.24E-02
Zinc	3.63E-02
HPAHs *	2.06E-04
Total PAHs *	1.17E-04
4,4'-DDD	7.67E-05
4,4'-DDT *	-
Acetone	9.45E-04
Aldrin	2.31E-06
Aluminum	1.43E+00
Barium	7.49E-03
Benzo(g,h,i)perylene	4.24E-05
Benzo(k)fluoranthene	3.46E-03
Bis(ethylhexyl) Phthalate	9.29E-03
Boron	9.45E-01
Chromium	2.12E-01
Chromium VI	2.96E-02
Chrysene	3.75E-04
Di-n-butyl Phthalate	7.27E-03
Di-n-octyl Phthalate	3.33E-03
Iron	9.03E-02
Lithium	7.14E-02
Manganese	8.61E-03
Methoxyclor	2.94E-06
Molybdenum	8.82E-04
Silver	2.12E-03
Strontium	1.74E+00
Titanium	8.82E-04
Vanadium	7.77E-03
LPAHs++	-
HPAHs *	-
Total PAHs *	-

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.
** COPEC was measured in crab tissue and water, but not in sediment.
++ No LPAHs were detected in the surface water samples.
*** Expressed in dry weight.

TABLE G-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (GREEN HERON)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table G-1	
IR	Maximum Ingestion rate of sed (kg/day)***	1.88E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	EPC Sc	Intake
4,4'-DDT	2.10E-04	2.23E-09
Arsenic	7.74E+00	8.22E-05
Benzo(b)fluoranthene	1.09E-02	1.16E-07
Copper	1.13E+01	1.20E-04
Mercury	3.68E-02	3.91E-07
Nickel	1.99E+01	2.12E-04
Zinc	4.45E+01	4.73E-04
HPAH	1.09E-02	1.16E-07
TOTAL PAHs	1.09E-02	1.16E-07

TABLE G-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (GREEN HERON)

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table G-1	
IR	Maximum Ingestion rate of water (L/day)	2.09E-02	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Wc	Intake
4,4'-DDD	7.62E-06	8.99E-07
4,4'-DDT	1.30E-05	1.53E-06
Acetone	4.52E-03	5.33E-04
Aldrin	1.10E-05	1.30E-06
Aluminum	4.00E-01	4.72E-02
Barium	2.00E-02	2.36E-03
Benzo(g,h,i)perylene	2.02E-04	2.38E-05
Benzo(k)fluoranthene	3.11E-04	3.67E-05
Bis(ethylhexyl) Phthalate	1.97E-02	2.32E-03
Boron	4.50E+00	5.31E-01
Chromium	7.90E-02	9.32E-03
Chromium VI	1.10E-02	1.30E-03
Chrysene	3.68E-04	4.34E-05
Di-n-butyl Phthalate	1.42E-03	1.68E-04
Di-n-octyl Phthalate	6.50E-04	7.67E-05
Iron	4.30E-01	5.07E-02
Lithium	3.40E-01	4.01E-02
Manganese	4.10E-02	4.84E-03
Methoxyclor	1.40E-05	1.65E-06
Molybdenum	4.20E-03	4.95E-04
Silver	5.90E-03	6.96E-04
Strontium	8.31E+00	9.80E-01
Titanium	4.20E-03	4.95E-04
Vanadium	3.70E-02	4.37E-03
LPAHs++	0.00E+00	0.00E+00
HPAHs	8.81E-04	1.04E-04
Total PAHs	4.55E-04	5.36E-05

TABLE G-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (GREEN HERON)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFf * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table G-8	
Cw	Worm concentration (mg/kg)	see Table G-8	
IR	Maximum Ingestion rate of of food (kg/day)***	9.40E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	2.50E-01	Kent, 1986
Dff	Dietary fraction of fish (unitless)	7.50E-01	Kent, 1986
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Fish	Crab	Intake
4,4'-DDT	1.22E-04	2.98E-03	1.20E-06
Arsenic	1.25E+00	7.74E+00	3.25E-03
Benzo(b)fluoranthene	7.19E-03	2.34E-01	9.39E-05
Copper	1.13E+01	1.13E+01	6.02E-03
Mercury	1.19E-01	2.21E-03	1.67E-05
Nickel	1.08E+00	1.08E+00	5.72E-04
Zinc	5.08E+01	5.08E+01	2.69E-02
HPAH	7.19E-03	3.56E-02	1.51E-05
TOTAL PAHs	7.19E-03	3.56E-02	1.51E-05
4,4'-DDD	1.94E-01	9.09E-02	6.20E-05
4,4'-DDT	-	-	-
Acetone	4.52E-04	1.55E-01	6.18E-05
Aldrin	1.10E-05	2.26E-04	9.14E-08
Aluminum	1.08E+00	1.10E-05	1.43E-04
Barium	1.27E+01	1.63E+03	6.49E-01
Benzo(g,h,i)perylene	2.02E-04	4.00E+00	1.59E-03
Benzo(k)fluoranthene	1.56E-01	2.02E-04	2.07E-05
Bis(ethylhexyl) Phthalate	1.38E+00	4.11E+00	1.82E-03
Boron	4.50E+00	6.26E+00	3.09E-03
Chromium	1.50E+00	4.50E+00	1.99E-03
Chromium VI	2.09E-01	2.37E+02	9.44E-02
Chrysene	1.84E-01	3.30E+01	1.32E-02
Di-n-butyl Phthalate	1.33E+01	3.61E-01	1.92E-03
Di-n-octyl Phthalate	6.11E+00	8.44E+00	4.17E-03
Iron	4.30E-01	3.86E+00	1.60E-03
Lithium	3.40E-01	4.30E-01	2.16E-04
Manganese	4.10E-02	3.40E-01	1.41E-04
Methoxyclor	1.40E-05	4.10E-02	1.63E-05
Molybdenum	4.20E-03	1.40E-05	5.63E-07
Silver	5.17E-01	4.20E-03	7.03E-05
Strontium	8.31E+00	5.30E-02	1.12E-03
Titanium	4.20E-03	8.31E+00	3.31E-03
Vanadium	3.70E-02	4.20E-03	6.58E-06
LPAHs++	0.00E+00	3.70E-02	1.47E-05
HPAHs	-	-	-

TABLE G-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (GREEN HERON)

Total PAHs	-	-	-

TABLE G-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (GREEN HERON)

TOTAL INTAKE

INTAKE = Sediment Intake + Water Intake + Food Intake

Chemical	Total Intake
4,4'-DDT *	2.74E-06
Arsenic	3.33E-03
Benzo(b)fluoranthene	9.40E-05
Copper	6.14E-03
Mercury	1.70E-05
Nickel	7.83E-04
Zinc	2.74E-02
HPAHs *	1.19E-04
Total PAHs *	6.89E-05
4,4'-DDD	6.29E-05
4,4'-DDT *	-
Acetone	5.95E-04
Aldrin	1.39E-06
Aluminum	4.73E-02
Barium	6.52E-01
Benzo(g,h,i)perylene	1.62E-03
Benzo(k)fluoranthene	5.74E-05
Bis(ethylhexyl) Phthalate	4.14E-03
Boron	5.34E-01
Chromium	1.13E-02
Chromium VI	9.57E-02
Chrysene	1.32E-02
Di-n-butyl Phthalate	2.08E-03
Di-n-octyl Phthalate	4.25E-03
Iron	5.23E-02
Lithium	4.03E-02
Manganese	4.98E-03
Methoxyclor	1.80E-05
Molybdenum	4.96E-04
Silver	7.66E-04
Strontium	9.81E-01
Titanium	3.80E-03
Vanadium	4.37E-03
LPAHs++	1.47E-05
HPAHs *	-
Total PAHs *	-

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.
** COPEC was measured in crab tissue and water, but not in sediment.
++ No LPAHs were detected in the surface water samples.

TABLE G-5
INTAKE CALCULATIONS FOR INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (GREEN HERON)

*** Expressed in dry weight.

TABLE G-6
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS
INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (SANDPIPER)

Ecological Hazard Quotient = Total Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table G-2

Chemical	**Total Intake**	**TRV Sandpiper**		**EHQ**
4,4'-DDT	3.82E-06	2.27E-01	<	1.68E-05
Arsenic	7.22E-03	2.46E+00		2.94E-03
Benzo(b)fluoranthene	8.76E-05			
Copper	7.21E-03	4.05E+00		1.78E-03
Mercury	1.38E-05	3.25E+00		4.25E-06
Nickel	1.24E-02	6.71E+00		1.85E-03
Zinc	3.63E-02	6.61E+01		5.50E-04
HPAH	2.06E-04			
TOTAL PAHs	1.17E-04			
4,4'-DDD	7.67E-05	8.45E+02		9.08E-08
4,4'-DDT	-	-		-
Acetone	9.45E-04	5.20E+04		1.82E-08
Aldrin	2.31E-06			
Aluminum	1.43E+00	1.00E+02		1.43E-02
Barium	7.49E-03	2.08E+01		3.60E-04
Benzo(g,h,i)perylene	4.24E-05			
Benzo(k)fluoranthene	3.46E-03	1.40E-01		2.47E-02
Bis(ethylhexyl) Phthalate	9.29E-03	1.11E+02		8.37E-05
Boron	9.45E-01			
Chromium	2.12E-01	1.00E+00		2.12E-01
Chromium VI	2.96E-02	1.00E+00		2.96E-02
Chrysene	3.75E-04	1.00E+00		3.75E-04
Di-n-butyl Phthalate	7.27E-03	1.11E+02		6.55E-05
Di-n-octyl Phthalate	3.33E-03	1.11E+02		3.00E-05
Iron	9.03E-02			
Lithium	7.14E-02			
Manganese	8.61E-03			
Methoxyclor	2.94E-06			
Molybdenum	8.82E-04			
Silver	2.12E-03	1.78E+02		1.19E-05
Strontium	1.74E+00			
Titanium	8.82E-04			
Vanadium	7.77E-03			
LPAHs++	-	-		-
HPAHs	-	-		-
Total PAHs	-	-		-

TABLE G-7
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS
INTRACOASTAL WATERWAY SEDIMENT -- BACKGROUND
Avian Carnivore (GREEN HERON)

Ecological Hazard Quotient = Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	See Table G-2

Chemical	Total Intake	TRV Green Heron		EHQ
4,4'-DDT	2.74E-06	2.27E-01	<	1.21E-05
Arsenic	3.33E-03	2.46E+00		1.35E-03
Benzo(b)fluoranthene	9.40E-05			
Copper	6.14E-03	4.05E+00		1.52E-03
Mercury	1.70E-05	3.25E+00		5.24E-06
Nickel	7.83E-04	6.71E+00		1.17E-04
Zinc	2.74E-02	6.61E+01		4.15E-04
HPAH	1.19E-04			
TOTAL PAHs	6.89E-05			
4,4'-DDD	6.29E-05	8.45E+02		7.44E-08
4,4'-DDT	-	-		-
Acetone	5.95E-04	5.20E+04		1.14E-08
Aldrin	1.39E-06			
Aluminum	4.73E-02	1.00E+02		4.73E-04
Barium	6.52E-01	2.08E+01		3.13E-02
Benzo(g,h,i)perylene	1.62E-03			
Benzo(k)fluoranthene	5.74E-05	1.40E-01		4.10E-04
Bis(ethylhexyl) Phthalate	4.14E-03	1.11E+02		3.73E-05
Boron	5.34E-01			
Chromium	1.13E-02	1.00E+00		1.13E-02
Chromium VI	9.57E-02	1.00E+00		9.57E-02
Chrysene	1.32E-02	1.00E+00		1.32E-02
Di-n-butyl Phthalate	2.08E-03	1.11E+02		1.88E-05
Di-n-octyl Phthalate	4.25E-03	1.11E+02		3.83E-05
Iron	5.23E-02			
Lithium	4.03E-02			
Manganese	4.98E-03			
Methoxyclor	1.80E-05			
Molybdenum	4.96E-04			
Silver	7.66E-04	1.78E+02		4.31E-06
Strontium	9.81E-01			
Titanium	3.80E-03			
Vanadium	4.37E-03			
LPAHs++	1.47E-05			-
HPAHs	-	-		-
Total PAHs	-	-		-

TABLE G-8
CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg) -- BACKGROUND SEDIMENT

Cfood = Csed x BSAF or Cwtr x BCF

where:

Cfood =	Chemical Concentration in food (mg/kg dry)
Csed =	Chemical Concentration in sediment (mg/kg dry)
Cwtr =	Chemical Concentration in water (mg/L)
BSAF =	Biota to Sediment Accumulation Factor (unitless)
BCF =	Bioconcentration Factor (unitless)

Compound	Csed (mg/kg)	Sediment to Worm BSAF	Worm Concentration	Reference	Sediment to Crab BSAF	Crab Concentration	Reference	Sediment to Fish BSAF	Fish Concentration	Reference
4,4'-DDT	2.10E-04	8.00E-01	1.68E-04	BSAF DB	-	>0.00298	*	5.80E-01	1.22E-04	WSDOH, 1995
Arsenic	7.74E+00	9.00E-01	6.97E+00	EPA, 1999	1.00E+00	7.74E+00	**	1.62E-01	1.25E+00	EPA, 2000
Benzo(b)fluoranthene	1.09E-02	1.61E+00	1.75E-02	EPA, 1999	-	>0.234	*	6.60E-01	7.19E-03	WSDOH, 1995
Copper	1.13E+01	3.00E-01	3.40E+00	EPA, 1999	1.00E+00	1.13E+01	**	1.00E+00	1.13E+01	Max value from Calcasieu RI
Mercury	3.68E-02	4.00E-01	1.47E-02	EPA, 1999	6.00E-02	2.21E-03	Max value from Calcasieu RI	3.23E+00	1.19E-01	Max value from Calcasieu RI
Nickel	1.99E+01	9.00E-01	1.79E+01	EPA, 1999	0.054	1.08E+00	Max value from Calcasieu RI	5.40E-02	1.08E+00	Max value from Calcasieu RI
Zinc	4.45E+01	5.70E-01	2.54E+01	EPA, 1999	1.14	5.08E+01	Max value from Calcasieu RI	1.14E+00	5.08E+01	Max value from Calcasieu RI
HPAH	1.09E-02	1.61E+00	1.75E-02	EPA, 1999	3.27	3.56E-02	max PAH	6.60E-01	7.19E-03	WSDOH, 1995
TOTAL PAHs	1.09E-02	1.61E+00	1.75E-02	EPA, 1999	3.27	3.56E-02	max PAH	6.60E-01	7.19E-03	WSDOH, 1995

Compound	Cwtr (mg/kg)	Water to Worm BCF	Worm Concentration	Reference	Water to Crab BCF	Crab Concentration	Reference	Water to Fish BCF	Fish Concentration	Reference
4,4'-DDD	7.62E-06	1.19E+04	9.09E-02	EPA, 1999	1.19E+04	9.09E-02	EPA, 1999	2.55E+04	1.94E-01	EPA, 1999
4,4'-DDT	1.30E-05	1.19E+04	1.55E-01	EPA, 1999	1.19E+04	1.55E-01	EPA, 1999	2.55E+04	3.32E-01	EPA, 1999
Acetone	4.52E-03	5.00E-02	2.26E-04	EPA, 1999	5.00E-02	2.26E-04	EPA, 1999	1.00E-01	4.52E-04	EPA, 1999
Aldrin	1.10E-05	1.00E+00	1.10E-05	EPA, 1997	1.00E+00	1.10E-05	EPA, 1997	1.00E+00	1.10E-05	EPA, 1997
Aluminum	4.00E-01	4.07E+03	1.63E+03	EPA, 1999	4.07E+03	1.63E+03	EPA, 1999	2.70E+00	1.08E+00	EPA, 1999
Barium	2.00E-02	2.00E+02	4.00E+00	EPA, 1999	2.00E+02	4.00E+00	EPA, 1999	6.33E+02	1.27E+01	EPA, 1999
Benzo(g,h,i)perylene	2.02E-04	1.00E+00	2.02E-04	EPA, 1997	1.00E+00	2.02E-04	EPA, 1997	1.00E+00	2.02E-04	EPA, 1997
Benzo(k)fluoranthene	3.11E-04	1.32E+04	4.11E+00	EPA, 1999	1.32E+04	4.11E+00	EPA, 1999	5.00E+02	1.56E-01	EPA, 1999
Bis(ethylhexyl) Phthalate	1.97E-02	3.18E+02	6.26E+00	EPA, 1999	3.18E+02	6.26E+00	EPA, 1999	7.00E+01	1.38E+00	EPA, 1999
Boron	4.50E+00	1.00E+00	4.50E+00	EPA, 1997	1.00E+00	4.50E+00	EPA, 1997	1.00E+00	4.50E+00	EPA, 1997
Chromium	7.90E-02	3.00E+03	2.37E+02	EPA, 1999	3.00E+03	2.37E+02	EPA, 1999	1.90E+01	1.50E+00	EPA, 1999
Chromium VI	1.10E-02	3.00E+03	3.30E+01	EPA, 1999	3.00E+03	3.30E+01	EPA, 1999	1.90E+01	2.09E-01	EPA, 1999
Chrysene	3.68E-04	9.80E+02	3.61E-01	EPA, 1999	9.80E+02	3.61E-01	EPA, 1999	5.00E+02	1.84E-01	EPA, 1999
Di-n-butyl Phthalate	1.42E-03	5.95E+03	8.44E+00	EPA, 1999	5.95E+03	8.44E+00	EPA, 1999	9.40E+03	1.33E+01	EPA, 1999
Di-n-octyl Phthalate	6.50E-04	5.95E+03	3.86E+00	EPA, 1999	5.95E+03	3.86E+00	EPA, 1999	9.40E+03	6.11E+00	EPA, 1999
Iron	4.30E-01	1.00E+00	4.30E-01	EPA, 1997	1.00E+00	4.30E-01	EPA, 1997	1.00E+00	4.30E-01	EPA, 1997
Lithium	3.40E-01	1.00E+00	3.40E-01	EPA, 1997	1.00E+00	3.40E-01	EPA, 1997	1.00E+00	3.40E-01	EPA, 1997
Manganese	4.10E-02	1.00E+00	4.10E-02	EPA, 1997	1.00E+00	4.10E-02	EPA, 1997	1.00E+00	4.10E-02	EPA, 1997
Methoxyclor	1.40E-05	1.00E+00	1.40E-05	EPA, 1997	1.00E+00	1.40E-05	EPA, 1997	1.00E+00	1.40E-05	EPA, 1997
Molybdenum	4.20E-03	1.00E+00	4.20E-03	EPA, 1997	1.00E+00	4.20E-03	EPA, 1997	1.00E+00	4.20E-03	EPA, 1997
Silver	5.90E-03	2.98E+02	1.76E+00	EPA, 1999	2.98E+02	>0.053	***	8.77E+01	5.17E-01	EPA, 1999
Strontium	8.31E+00	1.00E+00	8.31E+00	EPA, 1997	1.00E+00	8.31E+00	EPA, 1997	1.00E+00	8.31E+00	EPA, 1997
Titanium	4.20E-03	1.00E+00	4.20E-03	EPA, 1997	1.00E+00	4.20E-03	EPA, 1997	1.00E+00	4.20E-03	EPA, 1997
Vanadium	3.70E-02	1.00E+00	3.70E-02	EPA, 1997	1.00E+00	3.70E-02	EPA, 1997	1.00E+00	3.70E-02	EPA, 1997
LPAHs++	0.00E+00	1.00E+00	0.00E+00	EPA, 1997	1.00E+00	0.00E+00	EPA, 1997	1.00E+00	0.00E+00	EPA, 1997
HPAHs	8.81E-04	1.00E+00	8.81E-04	EPA, 1997	1.00E+00	8.81E-04	EPA, 1997	1.00E+00	8.81E-04	EPA, 1997
Total PAHs	4.55E-04	1.00E+00	4.55E-04	EPA, 1997	1.00E+00	4.55E-04	EPA, 1997	1.00E+00	4.55E-04	EPA, 1997

Notes:
* These compounds were analyzed but not detected in any blue crab samples collected at the Site so 1/2 of the detection limit was used.
*+ These compounds were not included in crab tissue analysis per the approved Sampling & Analysis Plan.
** If no BAF or BCF was available in the literature, a default value of 1.0 was used.
*** COPEC was measured in crab tissue and surface water, but not in sediment.

TABLE H-1
EXPOSURE POINT CONCENTATION (mg/kg)
SEDIMENT AND SURFACE WATER NORTH OF MARLIN

Chemical of Interest[+]	Exposure Point Concentration	Statistic Used
SEDIMENT		
2-Methylnaphthalene	< 1.20E-02	median
4,4'-DDT	2.52E-03	97.5% KM (Chebyshev)
Acenaphthene	< 1.10E-02	median
Acenaphthylene	< 1.27E-02	median
Anthracene	9.70E-02	97.5% KM (Chebyshev)
Arsenic	4.81E+00	97.5% Chebyshev
Benzo(a)anthracene	< 1.14E-02	median
Benzo(a)pyrene	3.47E-01	97.5% Chebyshev
Benzo(b)fluoranthene	1.59E-01	95% KM (BCA)
Benzo(g,h,i)perylene	4.49E-01	95% KM (BCA)
Benzo(k)fluoranthene	1.31E-01	95% KM (Bootstrap)
Cadmium	2.42E-01	97.5% Chebyshev
Chrysene	8.71E-01	97.5% Chebyshev
Copper	2.21E+01	97.5% Chebyshev
Dibenz(a,h)anthracene	< 3.75E-02	median
Endosulfan Sulfate	< 4.40E-04	median
Endrin Aldehyde	3.32E-03	97.5% Chebyshev
Endrin Ketone	< 5.50E-04	median
Fluoranthene	4.46E-01	97.5% Chebyshev
Fluorene	< 1.10E-02	median
gamma-Chlordane	< 4.40E-04	median
Indeno(1,2,3-cd)pyrene	3.17E-01	95% KM (BCA)
Lead	4.68E+01	95% Chebyshev
Mercury	3.80E-02	97.5% Chebyshev
Nickel	1.81E+01	95% Student's-t
Phenanthrene	1.56E-01	95% KM (BCA)
Pyrene	4.71E-01	97.5% Chebyshev
Zinc	2.36E+02	95% Chebyshev
LPAH	3.00E-01	
HPAH	3.24E+00	
TOTAL PAHs	3.54E+00	
SURFACE WATER [1]		
1,2-Dichloroethane	3.85E-03	EPC is max detect
Acrolein	9.30E-03	EPC is max detect
Aluminum	8.00E-01	EPC is max detect
Barium	3.70E-01	EPC is max detect
Boron	2.42E+00	EPC is max detect
Chromium	3.70E-02	EPC is max detect
Chromium VI	8.00E-03	EPC is max detect
Copper	1.10E-02	EPC is max detect
Iron	1.08E+00	EPC is max detect
Lithium	2.50E-01	EPC is max detect
Manganese	3.40E-01	EPC is max detect
Mercury	7.00E-05	EPC is max detect
Molybdenum	1.50E-02	EPC is max detect
Nickel	2.20E-03	EPC is max detect
Strontium	6.64E+00	EPC is max detect
Titanium	9.80E-03	EPC is max detect
Zinc	2.20E-02	EPC is max detect

Notes:

[+] Chemicals of interest are any chemical measured in at least one sample.

(1) - Exposure Point Concentration from Table 3-2 of TCEQ, 2006; only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE H-2
TOXICITY REFERENCE VALUES

Parameter	Polychaetes (mg/kg)	Ref.	Comments	Polychaetes (mg/kg)	Ref.	Comments	Avian Carnivore (Sandpiper) (mg/kgBW-day)	Ref.	Comments	Avian Carnivore (Green heron) (mg/kgBW-day)	Ref.	Comments
2-Methylnaphthalene	7.00E-02	SQUIRT	ERL	6.70E-01	SQUIRT	ERM						
4,4'-DDT	1.19E-03	SQUIRT	ERL	6.29E-02	SQUIRT	ERM	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Acenaphthene	1.60E-02	SQUIRT	ERL	5.00E-01	SQUIRT	ERM						
Acenaphthylene	4.40E-02	SQUIRT	ERL	6.40E-01	SQUIRT	ERM						
Anthracene	8.53E-02	SQUIRT	ERL	1.10E+00	SQUIRT	ERM						
Arsenic	8.20E+00	SQUIRT	ERL	7.00E+01	SQUIRT	ERM						
Benzo(a)anthracene	2.61E-01	SQUIRT	ERL	1.60E+00	SQUIRT	ERM						
Benzo(a)pyrene	4.30E-01	SQUIRT	ERL	1.60E+00	SQUIRT	ERM						
Benzo(b)fluoranthene	1.80E+00	SQUIRT	AET	1.80E+00	SQUIRT	AET						
Benzo(g,h,i)perylene	6.70E-01	SQUIRT	AET	6.70E-01	SQUIRT	AET						
Benzo(k)fluoranthene	1.80E+00	SQUIRT	AET	1.80E+00	SQUIRT	AET						
Cadmium	1.20E+00	SQUIRT	ERL	9.60E+00	SQUIRT	ERM	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth
Chrysene	3.84E-01	SQUIRT	ERL	2.80E+00	SQUIRT	ERM						
Copper	3.40E+01	SQUIRT	ERL	2.70E+02	SQUIRT	ERM	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Dibenz(a,h)anthracene	6.34E-02	SQUIRT	ERL	2.60E-01	SQUIRT	ERM						
Endosulfan Sulfate												
Endrin Aldehyde	2.67E-03	SQUIRT	TEL for freshwater sediment	6.24E-02	SQUIRT	PEL for freshwater sediment	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1
Endrin Ketone	2.67E-03	SQUIRT	TEL for freshwater sediment	6.24E-02	SQUIRT	PEL for freshwater sediment	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1	1.00E-02	Sample, 1996	Chronic LOAEL in screech owl with an uncertainty factor of 0.1
Fluoranthene	6.00E-01	SQUIRT	ERL	5.10E+00	SQUIRT	ERM						
Fluorene	1.90E-02	SQUIRT	ERL	5.40E-01	SQUIRT	ERM						
gamma-Chlordane	2.26E-03	SQUIRT	ERL	4.79E-03	SQUIRT	ERM	2.14E+00	Sample, 1996	Chronic NOAEL in red-winged blackbird	2.14E+00	Sample, 1996	Chronic NOAEL in red-winged blackbird
Indeno(1,2,3-cd)pyrene	6.00E-01	SQUIRT	AET	6.00E-01	SQUIRT	AET						
Lead	4.67E+01	SQUIRT	ERL	2.18E+02	SQUIRT	ERM	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	1.63E+00	EPA, 2005e	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Mercury	1.50E-01	SQUIRT	ERL	7.10E-01	SQUIRT	ERM	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)	3.25E+00	EPA, 1999	Acute (5 days) LOAEL for mortality in coturnix quail (dose 325 with uncertainty factor of 0.01)
Nickel	2.09E+01	SQUIRT	ERL	5.16E+01	SQUIRT	ERM	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Phenanthrene	2.40E-01	SQUIRT	ERL	1.50E+00	SQUIRT	ERM						
Pyrene	6.65E-01	SQUIRT	ERL	2.60E+00	SQUIRT	ERM						
Zinc	1.50E+02	SQUIRT	ERL	4.10E+02	SQUIRT	ERM	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups
LPAH	5.52E-01	SQUIRT	ERL	3.16E+00	SQUIRT	ERM						
HPAH	1.70E+00	SQUIRT	ERL	9.60E+00	SQUIRT	ERM						
TOTAL PAHs	4.02E+00	SQUIRT	ERL	4.48E+01	SQUIRT	ERM						
1,2-Dichloroethane												
Acrolein												
Aluminum							1.00E+02	EPA, 1999		1.00E+02	EPA, 1999	
Barium							2.08E+01	EPA, 1999		2.08E+01	EPA, 1999	
Boron												
Chromium												
Chromium VI							1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Copper							4.70E+01	EPA, 1999		4.70E+01	EPA, 1999	
Iron												
Lithium												
Manganese												
Mercury							6.40E-03	EPA, 1999		6.40E-03	EPA, 1999	
Molybdenum												
Nickel							6.50E+01	EPA, 1999		6.50E+01	EPA, 1999	
Strontium												
Titanium												
Zinc							1.31E+02	EPA, 1999		1.31E+02	EPA, 1999	

Notes:
ERL -- Effects Range-Low
AET -- Apparent Effects Threshold
TEL -- Threshold Effects Level
PEL -- Probably Effects Level
EPA, 2007a -- DDT
EPA, 2007b -- PAHs
EPA, 2007d -- Nickel
EPA, 2005b -- Cadmium
EPA, 2007c -- Copper
EPA, 2007e -- Zinc
EPA, 2005e -- Lead

TABLE H-3
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
POLYCHAETES

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Sediment Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table H-2

Chemical	Exposure Point Concentration* (Sc)	TRV polychaetes	Maximum EHQ+
2-Methylnaphthalene	4.30E-01	7.00E-02	6.14E+00
4,4'-DDT	9.22E-03	1.19E-03	7.75E+00
Acenaphthene	1.33E-01	1.60E-02	8.31E+00
Acenaphthylene	5.45E-01	4.40E-02	1.24E+01
Anthracene	3.34E-01	8.53E-02	3.92E+00
Arsenic	1.28E+01	8.20E+00	1.56E+00
Benzo(a)anthracene	9.93E-01	2.61E-01	3.80E+00
Benzo(a)pyrene	1.30E+00	4.30E-01	3.02E+00
Benzo(b)fluoranthene	1.36E+00	1.80E+00	7.56E-01
Benzo(g,h,i)perylene	1.94E+00	6.70E-01	2.90E+00
Benzo(k)fluoranthene	7.30E-01	1.80E+00	4.06E-01
Cadmium	4.80E-01	1.20E+00	4.00E-01
Chrysene	4.05E+00	3.84E-01	1.05E+01
Copper	4.90E+01	3.40E+01	1.44E+00
Dibenz(a,h)anthracene	2.91E+00	6.34E-02	4.59E+01
Endosulfan Sulfate	6.00E-02		
Endrin Aldehyde	1.00E-02	2.67E-03	3.75E+00
Endrin Ketone	1.30E-02	2.67E-03	4.87E+00
Fluoranthene	2.17E+00	6.00E-01	3.62E+00
Fluorene	1.39E-01	1.90E-02	7.32E+00
gamma-Chlordane	3.60E-03	2.26E-03	1.59E+00
Indeno(1,2,3-cd)pyrene	1.94E+00	6.00E-01	3.23E+00
Lead	2.37E+02	4.67E+01	5.07E+00
Mercury	8.10E-02	1.50E-01	5.40E-01
Nickel	2.77E+01	2.09E+01	1.33E+00
Phenanthrene	1.30E+00	2.40E-01	5.42E+00
Pyrene	1.64E+00	6.65E-01	2.47E+00
Zinc	9.03E+02	1.50E+02	6.02E+00
LPAH	1.15E+00	5.52E-01	2.08E+00
HPAH	1.39E+01	1.70E+00	8.19E+00
TOTAL PAHs	1.51E+01	4.02E+00	3.75E+00

Notes:
*EPC for benthic receptors is maximum measured concentration.
+Shading indicates HQ > 1.

TABLE H-4
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (SANDPIPER)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table H-1	
IR	Maximum Ingestion rate of sed (kg/day)**	5.34E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Sc	Intake
2-Methylnaphthalene	1.20E-02	1.88E-06
4,4'-DDT	2.52E-03	3.96E-07
Acenaphthene	1.10E-02	1.73E-06
Acenaphthylene	1.27E-02	1.99E-06
Anthracene	9.70E-02	1.52E-05
Arsenic	4.81E+00	7.55E-04
Benzo(a)anthracene	1.14E-02	1.78E-06
Benzo(a)pyrene	3.47E-01	5.45E-05
Benzo(b)fluoranthene	1.59E-01	2.50E-05
Benzo(g,h,i)perylene	4.49E-01	7.05E-05
Benzo(k)fluoranthene	1.31E-01	2.06E-05
Cadmium	2.42E-01	3.80E-05
Chrysene	8.71E-01	1.37E-04
Copper	2.21E+01	3.47E-03
Dibenz(a,h)anthracene	3.75E-02	5.89E-06
Endosulfan Sulfate	4.40E-04	6.91E-08
Endrin Aldehyde	3.32E-03	5.21E-07
Endrin Ketone	5.50E-04	8.63E-08
Fluoranthene	4.46E-01	7.00E-05
Fluorene	1.10E-02	1.73E-06
gamma-Chlordane	4.40E-04	6.91E-08
Indeno(1,2,3-cd)pyrene	3.17E-01	4.98E-05
Lead	4.68E+01	7.35E-03
Mercury	3.80E-02	5.96E-06
Nickel	1.81E+01	2.84E-03
Phenanthrene	1.56E-01	2.45E-05
Pyrene	4.71E-01	7.39E-05
Zinc	2.36E+02	3.70E-02
LPAH	3.00E-01	4.70E-05
HPAH	3.24E+00	5.08E-04
TOTAL PAHs	3.54E+00	5.56E-04

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table H-1	
IR	Maximum Ingestion rate of water (L/day)	7.11E-03	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Wc	Intake
1,2-Dichloroethane	3.85E-03	8.05E-04
Acrolein	9.29E-03	1.94E-03
Aluminum	8.00E-01	1.67E-01
Barium	3.70E-01	7.74E-02
Boron	2.42E+00	5.06E-01
Chromium	3.70E-02	7.74E-03
Chromium VI	8.00E-03	1.67E-03
Copper	1.10E-02	2.30E-03
Iron	1.08E+00	2.26E-01
Lithium	2.50E-01	5.23E-02
Manganese	3.40E-01	7.11E-02
Mercury	7.00E-05	1.46E-05
Molybdenum	1.50E-02	3.14E-03
Nickel	2.20E-03	4.60E-04
Strontium	6.64E+00	1.39E+00
Titanium	9.80E-03	2.05E-03
Zinc	2.20E-02	4.60E-03

TABLE H-4
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (SANDPIPER)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFw * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table H-8	
Cw	Worm concentration (mg/kg)	see Table H-8	
IR	Maximum Ingestion rate of of food (kg/day)**	2.81E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	4.00E-01	prof. judgement
Dfw	Dietary fraction of worms (unitless)	6.00E-01	prof. judgement
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Crab	Worm	Intake
2-Methylnaphthalene	1.20E-02	1.93E-02	1.35E-05
4,4'-DDT	2.98E-03	2.02E-03	1.98E-06
Acenaphthene	1.10E-02	1.77E-02	1.24E-05
Acenaphthylene	1.27E-02	2.04E-02	1.43E-05
Anthracene	3.17E-01	1.56E-01	1.82E-04
Arsenic	4.81E+00	4.33E+00	3.74E-03
Benzo(a)anthracene	2.92E-01	1.65E-02	1.05E-04
Benzo(a)pyrene	1.80E-01	5.52E-01	3.33E-04
Benzo(b)fluoranthene	2.29E-01	2.56E-01	2.03E-04
Benzo(g,h,i)perylene	4.49E-01	7.23E-01	5.07E-04
Benzo(k)fluoranthene	1.96E-01	2.11E-01	1.69E-04
Cadmium	2.42E-01	8.23E-01	4.88E-04
Chrysene	1.49E-01	1.20E+00	6.45E-04
Copper *	2.21E+01	6.64E+00	1.06E-02
Dibenz(a,h)anthracene	2.47E-01	6.04E-02	1.12E-04
Endosulfan Sulfate	2.20E-03	4.40E-04	9.45E-07
Endrin Aldehyde	3.32E-03	3.32E-03	2.74E-06
Endrin Ketone	5.50E-04	5.50E-04	4.54E-07
Fluoranthene	5.95E+00	7.18E-01	2.32E-03
Fluorene	1.10E-02	1.77E-02	1.24E-05
gamma-Chlordane	1.01E-03	2.59E-03	1.62E-06
Indeno(1,2,3-cd)pyrene	1.18E-01	5.10E-01	2.92E-04
Lead	9.50E-02	1.40E+00	7.27E-04
Mercury	2.28E-03	1.52E-02	8.29E-06
Nickel	9.77E-01	1.63E+01	8.40E-03
Phenanthrene	1.56E-01	2.51E-01	1.76E-04
Pyrene	4.71E-01	7.58E-01	5.31E-04
Zinc	2.69E+02	1.35E+02	1.56E-01
LPAH	9.80E-01	4.83E-01	5.63E-04
HPAH	1.06E+01	5.22E+00	6.09E-03
TOTAL PAHs	1.16E+01	5.70E+00	6.65E-03
1,2-Dichloroethane	0.00E+00	3.85E-03	1.91E-06
Acrolein	0.00E+00	9.29E-03	4.60E-06
Aluminum	0.00E+00	3.25E+03	1.61E+00
Barium	0.00E+00	7.40E+01	3.67E-02
Boron	0.00E+00	2.42E+00	1.20E-03
Chromium	0.00E+00	1.11E+02	5.50E-02
Chromium VI	0.00E+00	2.40E+01	1.19E-02
Copper	0.00E+00	4.09E+01	2.03E-02
Iron	0.00E+00	1.08E+00	5.35E-04
Lithium	0.00E+00	2.50E-01	1.24E-04
Manganese	0.00E+00	3.40E-01	1.69E-04
Mercury	0.00E+00	3.85E+00	1.91E-03
Molybdenum	0.00E+00	1.50E-02	7.43E-06
Nickel	0.00E+00	6.16E-02	3.05E-05
Strontium	0.00E+00	6.64E+00	3.29E-03
Titanium	0.00E+00	9.80E-03	4.86E-06
Zinc	0.00E+00	1.01E+02	4.99E-02

TABLE H-4
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (SANDPIPER)

TOTAL INTAKE

INTAKE = Sediment Intake + Water Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	1.54E-05
4,4'-DDT	2.38E-06
Acenaphthene	1.41E-05
Acenaphthylene	1.63E-05
Anthracene	1.97E-04
Arsenic	4.49E-03
Benzo(a)anthracene	1.06E-04
Benzo(a)pyrene	3.87E-04
Benzo(b)fluoranthene	2.27E-04
Benzo(g,h,i)perylene	5.77E-04
Benzo(k)fluoranthene	1.90E-04
Cadmium	5.26E-04
Chrysene	7.82E-04
Copper *	1.64E-02
Dibenz(a,h)anthracene	1.17E-04
Endosulfan Sulfate	1.01E-06
Endrin Aldehyde	3.26E-06
Endrin Ketone	5.41E-07
Fluoranthene	2.39E-03
Fluorene	1.41E-05
gamma-Chlordane	1.69E-06
Indeno(1,2,3-cd)pyrene	3.42E-04
Lead	8.07E-03
Mercury *	2.89E-05
Nickel *	1.17E-02
Phenanthrene	2.01E-04
Pyrene	6.05E-04
Zinc *	1.97E-01
LPAH	6.10E-04
HPAH	6.59E-03
TOTAL PAHs	7.20E-03
1,2-Dichloroethane	8.07E-04
Acrolein	1.95E-03
Aluminum	1.78E+00
Barium	1.14E-01
Boron	5.07E-01
Chromium	6.28E-02
Chromium VI	1.36E-02
Copper *	-
Iron	2.26E-01
Lithium	5.24E-02
Manganese	7.13E-02
Mercury *	-
Molybdenum	3.14E-03
Nickel *	-
Strontium	1.39E+00
Titanium	2.05E-03
Zinc *	-

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.

TABLE H-5
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (GREEN HERON)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table H-1	
IR	Maximum Ingestion rate of sed (kg/day)**	1.88E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Sc	Intake
2-Methylnaphthalene	1.20E-02	1.27E-07
4,4'-DDT	2.52E-03	2.68E-08
Acenaphthene	1.10E-02	1.17E-07
Acenaphthylene	1.27E-02	1.35E-07
Anthracene	9.70E-02	1.03E-06
Arsenic	4.81E+00	5.11E-05
Benzo(a)anthracene	1.14E-02	1.21E-07
Benzo(a)pyrene	3.47E-01	3.68E-06
Benzo(b)fluoranthene	1.59E-01	1.69E-06
Benzo(g,h,i)perylene	4.49E-01	4.77E-06
Benzo(k)fluoranthene	1.31E-01	1.39E-06
Cadmium	2.42E-01	2.57E-06
Chrysene	8.71E-01	9.25E-06
Copper	2.21E+01	2.35E-04
Dibenz(a,h)anthracene	3.75E-02	3.98E-07
Endosulfan Sulfate	4.40E-04	4.67E-09
Endrin Aldehyde	3.32E-03	3.52E-08
Endrin Ketone	5.50E-04	5.84E-09
Fluoranthene	4.46E-01	4.74E-06
Fluorene	1.10E-02	1.17E-07
gamma-Chlordane	4.40E-04	4.67E-09
Indeno(1,2,3-cd)pyrene	3.17E-01	3.37E-06
Lead	4.68E+01	4.97E-04
Mercury	3.80E-02	4.03E-07
Nickel	1.81E+01	1.92E-04
Phenanthrene	1.56E-01	1.66E-06
Pyrene	4.71E-01	5.00E-06
Zinc	2.36E+02	2.51E-03
LPAH	3.00E-01	3.18E-06
HPAH	3.24E+00	3.44E-05
TOTAL PAHs	3.54E+00	3.76E-05

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table H-1	
IR	Maximum Ingestion rate of water (L/day)	2.09E-02	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Wc	Intake
1,2-Dichloroethane	3.85E-03	4.54E-04
Acrolein	9.29E-03	1.10E-03
Aluminum	8.00E-01	9.44E-02
Barium	3.70E-01	4.37E-02
Boron	2.42E+00	2.85E-01
Chromium	3.70E-02	4.37E-03
Chromium VI	8.00E-03	9.44E-04
Copper	1.10E-02	1.30E-03
Iron	1.08E+00	1.27E-01
Lithium	2.50E-01	2.95E-02
Manganese	3.40E-01	4.01E-02
Mercury	7.00E-05	8.26E-06
Molybdenum	1.50E-02	1.77E-03
Nickel	2.20E-03	2.60E-04
Strontium	6.64E+00	7.83E-01
Titanium	9.80E-03	1.16E-03
Zinc	2.20E-02	2.60E-03

TABLE H-5
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (GREEN HERON)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFf * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table H-8	
Cw	Worm concentration (mg/kg)	see Table H-8	
IR	Ingestion rate of of food (kg/day)**	9.40E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	2.50E-01	Kent, 1986
Dff	Dietary fraction of fish (unitless)	7.50E-01	Kent, 1986
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Crab	Fish	Intake
2-Methylnaphthalene	1.20E-02	5.58E-02	2.38E-05
4,4'-DDT	2.98E-03	1.46E-03	9.77E-07
Acenaphthene	1.10E-02	5.45E-03	3.63E-06
Acenaphthylene	1.27E-02	6.29E-03	4.19E-06
Anthracene	3.17E-01	8.15E-03	4.53E-05
Arsenic	4.81E+00	7.80E-01	9.49E-04
Benzo(a)anthracene	2.92E-01	7.49E-03	4.17E-05
Benzo(a)pyrene	1.80E-01	2.29E-01	1.15E-04
Benzo(b)fluoranthene	2.29E-01	1.05E-01	7.22E-05
Benzo(g,h,i)perylene	4.49E-01	2.96E-01	1.78E-04
Benzo(k)fluoranthene	1.96E-01	8.65E-02	6.04E-05
Cadmium	2.42E-01	2.42E-01	1.28E-04
Chrysene	1.49E-01	5.75E-01	2.49E-04
Copper	2.21E+01	2.21E+01	1.18E-02
Dibenz(a,h)anthracene	2.47E-01	2.48E-02	4.26E-05
Endosulfan Sulfate	2.20E-03	4.40E-04	4.67E-07
Endrin Aldehyde	3.32E-03	3.32E-03	1.76E-06
Endrin Ketone	5.50E-04	5.50E-04	2.92E-07
Fluoranthene	5.95E+00	2.94E-01	9.07E-04
Fluorene	1.10E-02	5.45E-03	3.63E-06
gamma-Chlordane	1.01E-03	6.60E-04	3.97E-07
Indeno(1,2,3-cd)pyrene	1.18E-01	2.09E-01	9.89E-05
Lead	9.50E-02	9.36E-01	3.85E-04
Mercury	2.28E-03	1.23E-01	4.92E-05
Nickel	9.77E-01	9.77E-01	5.19E-04
Phenanthrene	1.56E-01	7.72E-02	5.14E-05
Pyrene	4.71E-01	3.11E-01	1.86E-04
Zinc	2.69E+02	2.69E+02	1.43E-01
LPAH	9.80E-01	1.48E-01	1.89E-04
HPAH	1.06E+01	2.14E+00	2.26E-03
TOTAL PAHs	1.16E+01	2.34E+00	2.47E-03
1,2-Dichloroethane	0.00E+00	3.85E-03	1.53E-06
Acrolein	0.00E+00	9.29E-03	3.70E-06
Aluminum	0.00E+00	2.16E+00	8.60E-04
Barium	0.00E+00	2.34E+02	9.32E-02
Boron	0.00E+00	2.42E+00	9.63E-04
Chromium	0.00E+00	7.03E-01	2.80E-04
Chromium VI	0.00E+00	1.52E-01	6.05E-05
Copper	0.00E+00	7.81E+00	3.11E-03
Iron	0.00E+00	1.08E+00	4.30E-04
Lithium	0.00E+00	2.50E-01	9.95E-05
Manganese	0.00E+00	3.40E-01	1.35E-04
Mercury	0.00E+00	7.82E-01	3.11E-04
Molybdenum	0.00E+00	1.50E-02	5.97E-06
Nickel	0.00E+00	1.72E-01	6.83E-05
Strontium	0.00E+00	6.64E+00	2.64E-03
Titanium	0.00E+00	9.80E-03	3.90E-06
Zinc	0.00E+00	4.53E+01	1.80E-02

TABLE H-5
INTAKE CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (GREEN HERON)

TOTAL INTAKE

INTAKE = Sediment Intake + Water Intake + Food Intake

Chemical	Total Intake
2-Methylnaphthalene	2.39E-05
4,4'-DDT	1.00E-06
Acenaphthene	3.74E-06
Acenaphthylene	4.32E-06
Anthracene	4.64E-05
Arsenic	1.00E-03
Benzo(a)anthracene	4.19E-05
Benzo(a)pyrene	1.19E-04
Benzo(b)fluoranthene	7.39E-05
Benzo(g,h,i)perylene	1.82E-04
Benzo(k)fluoranthene	6.18E-05
Cadmium	1.31E-04
Chrysene	2.58E-04
Copper *	1.33E-02
Dibenz(a,h)anthracene	4.30E-05
Endosulfan Sulfate	4.72E-07
Endrin Aldehyde	1.80E-06
Endrin Ketone	2.98E-07
Fluoranthene	9.12E-04
Fluorene	3.74E-06
gamma-Chlordane	4.02E-07
Indeno(1,2,3-cd)pyrene	1.02E-04
Lead	8.82E-04
Mercury *	5.78E-05
Nickel *	9.71E-04
Phenanthrene	5.31E-05
Pyrene	1.91E-04
Zinc *	1.48E-01
LPAH	1.92E-04
HPAH	2.29E-03
TOTAL PAHs	2.50E-03
1,2-Dichloroethane	4.56E-04
Acrolein	1.10E-03
Aluminum	9.52E-02
Barium	1.37E-01
Boron	2.86E-01
Chromium	4.64E-03
Chromium VI	1.00E-03
Copper *	-
Iron	1.28E-01
Lithium	2.96E-02
Manganese	4.02E-02
Mercury *	-
Molybdenum	1.78E-03
Nickel *	-
Strontium	7.86E-01
Titanium	1.16E-03
Zinc *	-

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.
**Ingestion rates are in dry weight.

TABLE H-6
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (SANDPIPER)

Ecological Hazard Quotient = Total Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table H-2

Chemical	Total Intake	TRV Sandpiper		EHQ
2-Methylnaphthalene	1.54E-05			
4,4'-DDT	2.38E-06	2.27E-01		1.05E-05
Acenaphthene	1.41E-05			
Acenaphthylene	1.63E-05			
Anthracene	1.97E-04			
Arsenic	4.49E-03			
Benzo(a)anthracene	1.06E-04			
Benzo(a)pyrene	3.87E-04			
Benzo(b)fluoranthene	2.27E-04			
Benzo(g,h,i)perylene	5.77E-04			
Benzo(k)fluoranthene	1.90E-04			
Cadmium	5.26E-04	1.47E+00		3.58E-04
Chrysene	7.82E-04			
Copper	1.64E-02	4.05E+00		4.05E-03
Dibenz(a,h)anthracene	1.17E-04			
Endosulfan Sulfate	1.01E-06			
Endrin Aldehyde	3.26E-06	1.00E-02		3.26E-04
Endrin Ketone	5.41E-07	1.00E-02	<	5.41E-05
Fluoranthene	2.39E-03			
Fluorene	1.41E-05			
gamma-Chlordane	1.69E-06	2.14E+00	<	7.88E-07
Indeno(1,2,3-cd)pyrene	3.42E-04			
Lead	8.07E-03	1.63E+00		4.95E-03
Mercury	2.89E-05	3.25E+00		8.89E-06
Nickel	1.17E-02	6.71E+00		1.74E-03
Phenanthrene	2.01E-04			
Pyrene	6.05E-04			
Zinc	1.97E-01	6.61E+01		2.98E-03
LPAH	6.10E-04			
HPAH	6.59E-03			
TOTAL PAHs	7.20E-03			
1,2-Dichloroethane	8.07E-04			
Acrolein	1.95E-03			
Aluminum	1.78E+00	1.00E+02		1.78E-02
Barium	1.14E-01	2.08E+01		5.48E-03
Boron	5.07E-01			
Chromium	6.28E-02			
Chromium VI	1.36E-02	1.00E+00		1.36E-02
Copper	-			
Iron	2.26E-01			
Lithium	5.24E-02			
Manganese	7.13E-02			
Mercury	-			
Molybdenum	3.14E-03			
Nickel	-			
Strontium	1.39E+00			
Titanium	2.05E-03			
Zinc	-			

TABLE H-7
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
Avian Carnivore (GREEN HERON)

Ecological Hazard Quotient = Total Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table H-2

Chemical	Total Intake	TRV Green Heron		EHQ
2-Methylnaphthalene	2.39E-05			
4,4'-DDT	1.00E-06	2.27E-01		4.42E-06
Acenaphthene	3.74E-06			
Acenaphthylene	4.32E-06			
Anthracene	4.64E-05			
Arsenic	1.00E-03			
Benzo(a)anthracene	4.19E-05			
Benzo(a)pyrene	1.19E-04			
Benzo(b)fluoranthene	7.39E-05			
Benzo(g,h,i)perylene	1.82E-04			
Benzo(k)fluoranthene	6.18E-05			
Cadmium	1.31E-04	1.47E+00		8.91E-05
Chrysene	2.58E-04			
Copper	1.33E-02	4.05E+00		3.28E-03
Dibenz(a,h)anthracene	4.30E-05			
Endosulfan Sulfate	4.72E-07			
Endrin Aldehyde	1.80E-06	1.00E-02		1.80E-04
Endrin Ketone	2.98E-07	1.00E-02	<	2.98E-05
Fluoranthene	9.12E-04			
Fluorene	3.74E-06			
gamma-Chlordane	4.02E-07	2.14E+00	<	1.88E-07
Indeno(1,2,3-cd)pyrene	1.02E-04			
Lead	8.82E-04	1.63E+00		5.41E-04
Mercury	5.78E-05	3.25E+00		1.78E-05
Nickel	9.71E-04	6.71E+00		1.45E-04
Phenanthrene	5.31E-05			
Pyrene	1.91E-04			
Zinc	1.48E-01	6.61E+01		2.24E-03
LPAH	1.92E-04			
HPAH	2.29E-03			
TOTAL PAHs	2.50E-03			
1,2-Dichloroethane	4.56E-04			
Acrolein	1.10E-03			
Aluminum	9.52E-02	1.00E+02		9.52E-04
Barium	1.37E-01	2.08E+01		6.58E-03
Boron	2.86E-01			
Chromium	4.64E-03			
Chromium VI	1.00E-03	1.00E+00		1.00E-03
Copper	-			
Iron	1.28E-01			
Lithium	2.96E-02			
Manganese	4.02E-02			
Mercury	-			
Molybdenum	1.78E-03			
Nickel	-			
Strontium	7.86E-01			
Titanium	1.16E-03			
Zinc	-			

TABLE H-8
CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg)

Cfood = Csed x BSAF or Cwtr x BCF

where:

Cfood =	Chemical Concentration in food (mg/kg dry)
Csed =	Chemical Concentration in sediment (mg/kg dry)
Cwtr =	Chemical Concentration in water (mg/L)
BSAF =	Biota to Sediment Accumulation Factor (unitless)
BCF =	Bioconcentration Factor (unitless)

Compound	Csed (mg/kg)	Sediment to Worm BSAF	Worm Concentration	Reference	Sediment to Crab BSAF	Crab Concentration	Reference	Sediment to Fish BSAF	Fish Concentration	Reference
2-Methylnaphthalene	1.20E-02	1.61E+00	1.93E-02	EPA, 1999	1.00E+00	1.20E-02	**	4.65E+00	5.58E-02	Brunson et al. (1998)
4,4'-DDT	2.52E-03	8.00E-01	2.02E-03	BSAF DB	*	2.98E-03	*	5.80E-01	1.46E-03	WSDOH, 1995
Acenaphthene	1.10E-02	1.61E+00	1.77E-02	EPA, 1999	1.00E+00	1.10E-02	**	4.95E-01	5.45E-03	WSDOH, 1995
Acenaphthylene	1.27E-02	1.61E+00	2.04E-02	EPA, 1999	1.00E+00	1.27E-02	**	4.95E-01	6.29E-03	WSDOH, 1995
Anthracene	9.70E-02	1.61E+00	1.56E-01	EPA, 1999	3.27E+00	3.17E-01	BSAF DB	8.40E-02	8.15E-03	WSDOH, 1995
Arsenic	4.81E+00	9.00E-01	4.33E+00	EPA, 1999	1.00E+00	4.81E+00	**	1.62E-01	7.80E-01	EPA, 2000
Benzo(a)anthracene	1.14E-02	1.45E+00	1.65E-02	EPA, 1999	*	2.92E-01	*	6.60E-01	7.49E-03	WSDOH, 1995
Benzo(a)pyrene	3.47E-01	1.59E+00	5.52E-01	EPA, 1999	*	1.80E-01	*	6.60E-01	2.29E-01	WSDOH, 1995
Benzo(b)fluoranthene	1.59E-01	1.61E+00	2.56E-01	EPA, 1999	*	2.29E-01	*	6.60E-01	1.05E-01	WSDOH, 1995
Benzo(g,h,i)perylene	4.49E-01	1.61E+00	7.23E-01	EPA, 1999	1.00E+00	4.49E-01	**	6.60E-01	2.96E-01	WSDOH, 1995
Benzo(k)fluoranthene	1.31E-01	1.61E+00	2.11E-01	EPA, 1999	*	1.96E-01	*	6.60E-01	8.65E-02	WSDOH, 1995
Cadmium	2.42E-01	3.40E+00	8.23E-01	EPA, 1999	1.00E+00	2.42E-01	**	1.00E+00	2.42E-01	**
Chrysene	8.71E-01	1.38E+00	1.20E+00	EPA, 1999	*	1.49E-01	*	6.60E-01	5.75E-01	WSDOH, 1995
Copper	2.21E+01	3.00E-01	6.64E+00	EPA, 1999	1.00E+00	2.21E+01	**	1.00E+00	2.21E+01	Max value from Calcasieu RI
Dibenz(a,h)anthracene	3.75E-02	1.61E+00	6.04E-02	EPA, 1999	*	2.47E-01	*	6.60E-01	2.48E-02	WSDOH, 1995
Endosulfan Sulfate	4.40E-04	1.00E+00	4.40E-04	**	5.00E+00	2.20E-03	BSAF DB	1.00E+00	4.40E-04	**
Endrin Aldehyde	3.32E-03	1.00E+00	3.32E-03	**	1.00E+00	3.32E-03	**	1.00E+00	3.32E-03	**
Endrin Ketone	5.50E-04	1.00E+00	5.50E-04	**	1.00E+00	5.50E-04	**	1.00E+00	5.50E-04	**
Fluoranthene	4.46E-01	1.61E+00	7.18E-01	EPA, 1999	1.33E+01	5.95E+00	BSAF DB	6.60E-01	2.94E-01	WSDOH, 1995
Fluorene	1.10E-02	1.61E+00	1.77E-02	EPA, 1999	1.00E+00	1.10E-02	**	4.95E-01	5.45E-03	WSDOH, 1995
gamma-Chlordane	4.40E-04	5.88E+00	2.59E-03	BSAF DB	2.30E+00	1.01E-03	BSAF DB	1.50E+00	6.60E-04	BSAF DB
Indeno(1,2,3-cd)pyrene	3.17E-01	1.61E+00	5.10E-01	EPA, 1999	*	1.18E-01	*	6.60E-01	2.09E-01	WSDOH, 1995
Lead	4.68E+01	3.00E-02	1.40E+00	EPA, 1999	*	9.50E-02	*	2.00E-02	9.36E-01	Max value from Calcasieu RI
Mercury	3.80E-02	4.00E-01	1.52E-02	EPA, 1999	6.00E-02	2.28E-03	Max value fr	3.23E+00	1.23E-01	Max value from Calcasieu RI
Nickel	1.81E+01	9.00E-01	1.63E+01	EPA, 1999	5.40E-02	9.77E-01	Max value fr	5.40E-02	9.77E-01	Max value from Calcasieu RI
Phenanthrene	1.56E-01	1.61E+00	2.51E-01	EPA, 1999	1.00E+00	1.56E-01	**	4.95E-01	7.72E-02	WSDOH, 1995
Pyrene	4.71E-01	1.61E+00	7.58E-01	EPA, 1999	1.00E+00	4.71E-01	**	6.60E-01	3.11E-01	WSDOH, 1995
Zinc	2.36E+02	5.70E-01	1.35E+02	EPA, 1999	1.14E+00	2.69E+02	Max value fr	1.14E+00	2.69E+02	Max value from Calcasieu RI
LPAH	3.00E-01	1.61E+00	4.83E-01	EPA, 1999	3.27E+00	9.80E-01	max PAH	4.95E-01	1.48E-01	WSDOH, 1995
HPAH	3.24E+00	1.61E+00	5.22E+00	EPA, 1999	3.27E+00	1.06E+01	max PAH	6.60E-01	2.14E+00	WSDOH, 1995
TOTAL PAHs	3.54E+00	1.61E+00	5.70E+00	EPA, 1999	3.27E+00	1.16E+01	max PAH	6.60E-01	2.34E+00	WSDOH, 1995

Compound	Cwtr (mg/L)	Water to Worm BCF	Worm Concentration	Reference	Water to Crab BCF	Crab Concentration	Reference	Water to Fish BCF	Fish Concentration	Reference
1,2-Dichloroethane	3.85E-03	1.00E+00	3.85E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	3.85E-03	EPA, 1997
Acrolein	9.29E-03	1.00E+00	9.29E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	9.29E-03	EPA, 1997
Aluminum	8.00E-01	4.07E+03	3.25E+03	EPA, 1999	-	0.00E+00	*+	2.70E+00	2.16E+00	EPA, 1999
Barium	3.70E-01	2.00E+02	7.40E+01	EPA, 1999	-	0.00E+00	*+	6.33E+02	2.34E+02	EPA, 1999
Boron	2.42E+00	1.00E+00	2.42E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	2.42E+00	EPA, 1997
Chromium	3.70E-02	3.00E+03	1.11E+02	EPA, 1999	-	0.00E+00	*+	1.90E+01	7.03E-01	EPA, 1999
Chromium VI	8.00E-03	3.00E+03	2.40E+01	EPA, 1999	-	0.00E+00	*+	1.90E+01	1.52E-01	EPA, 1999
Copper	1.10E-02	3.72E+03	4.09E+01	EPA, 1999	-	0.00E+00	*+	7.10E+02	7.81E+00	EPA, 1999
Iron	1.08E+00	1.00E+00	1.08E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	1.08E+00	EPA, 1997
Lithium	2.50E-01	1.00E+00	2.50E-01	EPA, 1997	-	0.00E+00	*+	1.00E+00	2.50E-01	EPA, 1997
Manganese	3.40E-01	1.00E+00	3.40E-01	EPA, 1997	-	0.00E+00	*+	1.00E+00	3.40E-01	EPA, 1997
Mercury	7.00E-05	5.50E+04	3.85E+00	EPA, 1999	-	0.00E+00	*+	1.12E+04	7.82E-01	EPA, 1999
Molybdenum	1.50E-02	1.00E+00	1.50E-02	EPA, 1997	-	0.00E+00	*+	1.00E+00	1.50E-02	EPA, 1997
Nickel	2.20E-03	2.80E+01	6.16E-02	EPA, 1999	-	0.00E+00	*+	7.80E+01	1.72E-01	EPA, 1999
Strontium	6.64E+00	1.00E+00	6.64E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	6.64E+00	EPA, 1997
Titanium	9.80E-03	1.00E+00	9.80E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	9.80E-03	EPA, 1997
Zinc	2.20E-02	4.58E+03	1.01E+02	EPA, 1999	-	0.00E+00	*+	2.06E+03	4.53E+01	EPA, 1999

Notes:
* These compounds were analyzed but not detected in any blue crab samples collected at the Site; so value is one-half of maximum detection limit.
*+ These compounds were not included in crab tissue analysis per the approved Sampling & Analysis Plan.
** If no BAF or BCF was available in the literature, a default value of 1.0 was used.
*** COPEC was measured in crab tissue and surface water, but not in sediment.

TABLE H-9
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR SEDIMENT NORTH OF MARLIN
POLYCHAETES -- MIDPOINT BETWEEN ERL AND ERM COMPARISON

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Sediment Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table H-2

Chemical	**Exposure Point Concentration* (Sc)**	**TRV polychaetes**	**Maximum EHQ⁺**
2-Methylnaphthalene	4.30E-01	3.70E-01	1.16E+00
4,4'-DDT	9.22E-03	3.20E-02	2.88E-01
Acenaphthene	1.33E-01	2.58E-01	5.16E-01
Acenaphthylene	5.45E-01	3.42E-01	1.59E+00
Anthracene	3.34E-01	5.93E-01	5.64E-01
Arsenic	1.28E+01	3.91E+01	3.27E-01
Benzo(a)anthracene	9.93E-01	9.31E-01	1.07E+00
Benzo(a)pyrene	1.30E+00	1.02E+00	1.28E+00
Benzo(b)fluoranthene	1.36E+00	1.80E+00	7.56E-01
Benzo(g,h,i)perylene	1.94E+00	6.70E-01	2.90E+00
Benzo(k)fluoranthene	7.30E-01	1.80E+00	4.06E-01
Cadmium	4.80E-01	5.40E+00	8.89E-02
Chrysene	4.05E+00	1.59E+00	2.54E+00
Copper	4.90E+01	1.52E+02	3.22E-01
Dibenz(a,h)anthracene	2.91E+00	1.62E-01	1.80E+01
Endosulfan Sulfate	6.00E-02		
Endrin Aldehyde	1.00E-02	3.25E-02	3.07E-01
Endrin Ketone	1.30E-02	3.25E-02	4.00E-01
Fluoranthene	2.17E+00	2.85E+00	7.61E-01
Fluorene	1.39E-01	2.80E-01	4.97E-01
gamma-Chlordane	3.60E-03	3.53E-03	1.02E+00
Indeno(1,2,3-cd)pyrene	1.94E+00	6.00E-01	3.23E+00
Lead	2.37E+02	1.32E+02	1.79E+00
Mercury	8.10E-02	4.30E-01	1.88E-01
Nickel	2.77E+01	3.63E+01	7.64E-01
Phenanthrene	1.30E+00	8.70E-01	1.49E+00
Pyrene	1.64E+00	1.63E+00	1.00E+00
Zinc	9.03E+02	2.80E+02	3.23E+00
LPAH	1.15E+00	1.86E+00	6.18E-01
HPAH	1.39E+01	5.65E+00	2.47E+00
TOTAL PAHs	1.51E+01	2.44E+01	6.18E-01

Notes:
*EPC for benthic receptors is maximum measured concentration.
⁺Shading indicates HQ > 1.

TABLE I-1
EXPOSURE POINT CONCENTATION (mg/kg)
POND SEDIMENT* AND SURFACE WATER

Parameter	Exposure Point Concentration	Statistic Used
SEDIMENT		
4,4'-DDD	< 2.00E-02	median
4,4'-DDT	< 1.10E-02	median
Benzo(b)fluoranthene	< 3.38E-02	median
Benzo(g,h,i)perylene	< 1.59E-02	median
Benzo(k)fluoranthene	< 2.75E-02	median
Cadmium	< 1.90E-01	median
Chrysene	< 1.40E-02	median
Copper	2.02E+01	95% Student's-t
Nickel	1.84E+01	95% Student's-t
Pyrene	< 1.96E-02	median
Zinc	9.61E+02	95% Chebyshev
HPAH	1.11E-01	
TOTAL PAHs	1.11E-01	
SURFACE WATER[1]		
4-Chloroaniline	8.00E-04	EPC is max detect
Aluminum	2.22E+00	EPC is max detect
Antimony	7.60E-03	EPC is max detect
Arsenic	1.30E-02	EPC is max detect
Barium	1.90E-01	EPC is max detect
Benzo(a)pyrene	3.00E-04	EPC is max detect
Benzo(b)fluoranthene	1.80E-03	EPC is max detect
Benzo(g,h,i)perylene	1.70E-03	EPC is max detect
Benzo(k)fluoranthene	5.00E-04	EPC is max detect
Bis(2-ethylhexyl)phthalate	4.00E-02	EPC is max detect
Boron	3.52E+00	EPC is max detect
Chromium	1.50E-03	EPC is max detect
Chromium VI	1.60E-02	EPC is max detect
Chrysene	7.00E-04	EPC is max detect
Cobalt	3.20E-03	EPC is max detect
Dibenz(a,h)anthracene	3.00E-03	EPC is max detect
Di-n-butyl Phthalate	3.80E-03	EPC is max detect
Indeno(1,2,3-cd)pyrene	3.40E-03	EPC is max detect
Iron	6.67E+00	EPC is max detect
Lead	1.10E-02	EPC is max detect
Lithium	1.60E-01	EPC is max detect
Manganese	1.44E+00	EPC is max detect
Molybdenum	1.80E-02	EPC is max detect
Nickel	7.90E-03	EPC is max detect
Selenium	9.80E-03	EPC is max detect
Silver	1.50E-02	EPC is max detect
Strontium	7.19E+00	EPC is max detect
Thallium	7.70E-03	EPC is max detect
Titanium	4.40E-02	EPC is max detect
Vanadium	8.40E-03	EPC is max detect
Zinc	6.30E-01	EPC is max detect
LPAHs		
HPAHs	1.14E-02	
Total PAHs	0.00E+00	

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) - Exposure Point Concentration from Table 3-2 of TCEQ, 2006; only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE I-2
TOXICITY REFERENCE VALUES

Parameter	Polychaetes (mg/kg)	Ref.	Comments	Polychaetes (mg/kg)	Ref.	Comments	Avian Carnivore (Sandpiper) (mg/kgBW-day)	Ref.	Comments	Avian Carnivore (Green heron) (mg/kgBW-day)	Ref.	Comments
4,4'-DDD	1.19E-03	SQUIRT	ERL	6.29E-02	SQUIRT	ERM	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
4,4'-DDT	1.19E-03	SQUIRT	ERL	6.29E-02	SQUIRT	ERM	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	2.27E-01	EPA, 2007a	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Benzo(b)fluoranthene	1.80E+00	SQUIRT	AET	1.80E+00	SQUIRT	AET						
Benzo(g,h,i)perylene	6.70E-01	SQUIRT	AET	6.70E-01	SQUIRT	AET						
Benzo(k)fluoranthene	1.80E+00	SQUIRT	AET	1.80E+00	SQUIRT	AET						
Cadmium	1.20E+00	SQUIRT	ERL	9.60E+00	SQUIRT	ERM	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth	1.47E+00	EPA, 1999	Geometric mean of NOAEL values for reproduction and growth
Chrysene	3.84E-01	SQUIRT	ERL	2.80E+00	SQUIRT	ERM						
Copper	3.40E+01	SQUIRT	ERL	2.70E+02	SQUIRT	ERM	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	4.05E+00	EPA, 2007c	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Nickel	2.09E+01	SQUIRT	ERL	5.16E+01	SQUIRT	ERM	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival	6.71E+00	EPA, 2007d	Highest bounded NOAEL for growth and reproduction lower than the lowest bounded LOAEL for reproduction, growth, and survival
Pyrene	6.65E-01	SQUIRT	ERL	2.60E+00	SQUIRT	ERM						
Zinc	1.50E+02	SQUIRT	ERL	4.10E+02	SQUIRT	ERM	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups	6.61E+01	EPA, 2007e	Geometric mean of NOAEL values within the reproductive and growth effect groups
HPAH	1.70E+00	SQUIRT	ERL	9.60E+00	SQUIRT	ERM						
TOTAL PAHs	4.02E+00	SQUIRT	ERL	4.48E+01	SQUIRT	ERM						
4-Chloroaniline												
Aluminum							1.00E+02	EPA, 1999		1.00E+02	EPA, 1999	
Antimony												
Arsenic							2.46E+00	EPA, 1999		2.46E+00	EPA, 1999	
Barium							2.08E+01	EPA, 1999		2.08E+01	EPA, 1999	
Benzo(a)pyrene							1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Benzo(b)fluoranthene							1.40E-01	EPA, 1999		1.40E-01	EPA, 1999	
Benzo(g,h,i)perylene												
Benzo(k)fluoranthene							1.40E-01	EPA, 1999		1.40E-01	EPA, 1999	
Bis(2-ethylhexyl)phthalate							1.11E+02	EPA, 1999		1.11E+02	EPA, 1999	
Boron												
Chromium							1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Chromium VI							1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Chrysene							1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Cobalt												
Dibenz(a,h)anthracene							3.90E-01	EPA, 1999		3.90E-01	EPA, 1999	
Di-n-butyl Phthalate												
Indeno(1,2,3-cd)pyrene							1.00E+00	EPA, 1999		1.00E+00	EPA, 1999	
Iron												
Lead							2.50E-02	EPA, 1999		2.50E-02	EPA, 1999	
Lithium												
Manganese												
Molybdenum												
Nickel							6.50E+01	EPA, 1999		6.50E+01	EPA, 1999	
Selenium							5.00E-01	EPA, 1999		5.00E-01	EPA, 1999	
Silver							1.78E+02	EPA, 1999		1.78E+02	EPA, 1999	
Strontium												
Thallium							3.50E-01	EPA, 1999		3.50E-01	EPA, 1999	
Titanium												
Vanadium												
Zinc							1.31E+02	EPA, 1999		1.31E+02	EPA, 1999	
LPAHs												
HPAHs												
Total PAHs												

Notes:
ERL -- Effects Range-Low
AET -- Apparent Effects Threshold
EPA, 2007a -- DDT
EPA, 2007b -- PAHs
EPA, 2007c -- Copper
EPA, 2007d -- Nickel
EPA, 2007e -- Zinc

TABLE I-3
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR POND SEDIMENT
POLYCHAETES

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Sediment Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see Table I-2

Chemical	**Exposure Point Concentration* (Sc)**	**TRV polychaetes**	**Maximum EHQ+**
4,4'-DDD	6.76E-04	1.19E-03	5.68E-01
4,4'-DDT	1.57E-03	1.19E-03	1.32E+00
Benzo(b)fluoranthene	1.06E-01	1.80E+00	5.89E-02
Benzo(g,h,i)perylene	1.35E-01	6.70E-01	2.01E-01
Benzo(k)fluoranthene	1.30E-01	1.80E+00	7.22E-02
Cadmium	2.70E-01	1.20E+00	2.25E-01
Chrysene	2.57E-02	3.84E-01	6.69E-02
Copper	2.68E+01	3.40E+01	7.88E-01
Nickel	2.06E+01	2.09E+01	9.86E-01
Pyrene	2.65E-02	6.65E-01	3.98E-02
Zinc	9.99E+02	1.50E+02	6.66E+00
HPAH	1.11E-01	1.70E+00	6.52E-02
TOTAL PAHs	1.11E-01	4.02E+00	2.75E-02

Notes:
*EPC for benthic receptors is maximum measured concentration.
+Shading indicates HQ > 1.

TABLE I-4
INTAKE CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (SANDPIPER)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table I-1	
IR	Maximum Ingestion rate of sed (kg/day)***	5.34E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Sc	Intake
4,4'-DDD	2.00E-02	3.14E-06
4,4'-DDT	1.10E-02	1.73E-06
Benzo(b)fluoranthene	3.38E-02	5.30E-06
Benzo(g,h,i)perylene	1.59E-02	2.50E-06
Benzo(k)fluoranthene	2.75E-02	4.32E-06
Cadmium	1.90E-01	2.98E-05
Chrysene	1.40E-02	2.20E-06
Copper	2.02E+01	3.17E-03
Nickel	1.84E+01	2.89E-03
Pyrene	1.96E-02	3.08E-06
Zinc	9.61E+02	1.51E-01
HPAH	1.11E-01	1.74E-05
TOTAL PAHs	1.11E-01	1.74E-05

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table I-1	
IR	Maximum Ingestion rate of water (L/day)	7.11E-03	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Wc	Intake
4-Chloroaniline	8.23E-04	1.72E-04
Aluminum	2.22E+00	4.64E-01
Antimony	7.60E-03	1.59E-03
Arsenic	1.30E-02	2.72E-03
Barium	1.90E-01	3.97E-02
Benzo(a)pyrene	3.48E-04	7.28E-05
Benzo(b)fluoranthene	1.81E-03	3.79E-04
Benzo(g,h,i)perylene	1.73E-03	3.62E-04
Benzo(k)fluoranthene	5.42E-04	1.13E-04
Bis(2-ethylhexyl)phthalate	4.00E-02	8.36E-03
Boron	3.52E+00	7.36E-01
Chromium	1.50E-03	3.14E-04
Chromium VI	1.60E-02	3.35E-03
Chrysene	7.10E-04	1.48E-04
Cobalt	3.20E-03	6.69E-04
Dibenz(a,h)anthracene	3.04E-03	6.36E-04
Di-n-butyl Phthalate	3.81E-03	7.97E-04
Indeno(1,2,3-cd)pyrene	3.44E-03	7.19E-04
Iron	6.67E+00	1.39E+00
Lead	1.10E-02	2.30E-03
Lithium	1.60E-01	3.35E-02
Manganese	1.44E+00	3.01E-01
Molybdenum	1.80E-02	3.76E-03
Nickel	7.90E-03	1.65E-03
Selenium	9.80E-03	2.05E-03
Silver	1.50E-02	3.14E-03
Strontium	7.19E+00	1.50E+00
Thallium	7.70E-03	1.61E-03
Titanium	4.40E-02	9.20E-03
Vanadium	8.40E-03	1.76E-03
Zinc	6.30E-01	1.32E-01
LPAHs	0.00E+00	0.00E+00
HPAHs	1.16E-02	2.43E-03
Total PAHs	2.64E-03	5.52E-04

TABLE I-4
INTAKE CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (SANDPIPER)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFw * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table I-8	
Cw	Worm concentration (mg/kg)	see Table I-8	
IR	Maximum Ingestion rate of of food (kg/day)***	2.81E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	4.00E-01	prof. judgement
Dfw	Dietary fraction of worms (unitless)	6.00E-01	prof. judgement
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	3.40E-02	EPA, 1993

Chemical	Crab	Worm	Intake
4,4'-DDD	3.73E-03	1.60E-02	9.16E-06
4,4'-DDT	2.98E-03	8.80E-03	5.34E-06
Benzo(b)fluoranthene	2.29E-01	5.44E-02	1.03E-04
Benzo(g,h,i)perylene	1.59E-02	2.56E-02	1.79E-05
Benzo(k)fluoranthene	1.96E-01	4.43E-02	8.67E-05
Cadmium	1.90E-01	6.46E-01	3.83E-04
Chrysene	1.49E-01	4.80E-02	7.30E-05
Copper	2.02E+01	6.05E+00	9.66E-03
Nickel	9.94E-01	1.66E+01	8.54E-03
Pyrene	1.96E-02	3.16E-02	2.21E-05
Zinc	1.10E+03	5.48E+02	6.33E-01
HPAH	2.29E-01	1.78E-01	1.64E-04
TOTAL PAHs	2.29E-01	1.78E-01	1.64E-04
4-Chloroaniline	0.00E+00	8.23E-04	4.08E-07
Aluminum	0.00E+00	9.03E+03	4.47E+00
Antimony	0.00E+00	5.32E-02	2.64E-05
Arsenic	0.00E+00	9.49E-01	4.70E-04
Barium	0.00E+00	3.80E+01	1.88E-02
Benzo(a)pyrene	0.00E+00	1.63E+00	8.10E-04
Benzo(b)fluoranthene	0.00E+00	8.50E+00	4.21E-03
Benzo(g,h,i)perylene	0.00E+00	1.73E-03	8.57E-07
Benzo(k)fluoranthene	0.00E+00	7.17E+00	3.55E-03
Bis(2-ethylhexyl)phthalate	0.00E+00	1.27E+01	6.30E-03
Boron	0.00E+00	3.52E+00	1.74E-03
Chromium	0.00E+00	4.50E+00	2.23E-03
Chromium VI	0.00E+00	4.80E+01	2.38E-02
Chrysene	0.00E+00	6.96E-01	3.45E-04
Cobalt	0.00E+00	3.20E-03	1.59E-06
Dibenz(a,h)anthracene	0.00E+00	2.16E+00	1.07E-03
Di-n-butyl Phthalate	0.00E+00	2.27E+01	1.12E-02
Indeno(1,2,3-cd)pyrene	0.00E+00	1.62E+01	8.01E-03
Iron	0.00E+00	6.67E+00	3.31E-03
Lead	0.00E+00	5.56E+01	2.76E-02
Lithium	0.00E+00	1.60E-01	7.93E-05
Manganese	0.00E+00	1.44E+00	7.14E-04
Molybdenum	0.00E+00	1.80E-02	8.92E-06
Nickel	0.00E+00	2.21E-01	1.10E-04
Selenium	0.00E+00	1.24E+01	6.13E-03
Silver **	5.30E-02	4.47E+00	2.23E-03
Strontium	0.00E+00	7.19E+00	3.56E-03
Thallium	0.00E+00	1.16E+02	5.72E-02
Titanium	0.00E+00	4.40E-02	2.18E-05
Vanadium	0.00E+00	8.40E-03	4.16E-06
Zinc	0.00E+00	2.88E+03	1.43E+00
LPAHs	0.00E+00	0.00E+00	0.00E+00
HPAHs	0.00E+00	1.16E-02	5.76E-06
Total PAHs	0.00E+00	2.64E-03	1.31E-06

TABLE I-4
INTAKE CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (SANDPIPER)

TOTAL INTAKE

INTAKE = Sediment Intake +Water Intake + Food Intake

Chemical	Total Intake
4,4'-DDD	1.23E-05
4,4'-DDT	7.07E-06
Benzo(b)fluoranthene *	4.86E-04
Benzo(g,h,i)perylene *	3.82E-04
Benzo(k)fluoranthene *	2.04E-04
Cadmium	4.13E-04
Chrysene *	2.24E-04
Copper	1.28E-02
Nickel *	1.31E-02
Pyrene	2.52E-05
Zinc *	9.16E-01
HPAH *	2.61E-03
Total PAHs *	7.33E-04
4-Chloroaniline	1.73E-04
Aluminum	4.94E+00
Antimony	1.62E-03
Arsenic	3.19E-03
Barium	5.86E-02
Benzo(a)pyrene	8.83E-04
Benzo(b)fluoranthene *	-
Benzo(g,h,i)perylene *	-
Benzo(k)fluoranthene *	-
Bis(2-ethylhexyl)phthalate	1.47E-02
Boron	7.38E-01
Chromium	2.54E-03
Chromium VI	2.71E-02
Chrysene *	-
Cobalt	6.71E-04
Dibenz(a,h)anthracene	1.71E-03
Di-n-butyl Phthalate	1.20E-02
Indeno(1,2,3-cd)pyrene	8.73E-03
Iron	1.40E+00
Lead	2.99E-02
Lithium	3.35E-02
Manganese	3.02E-01
Molybdenum	3.77E-03
Nickel *	-
Selenium	8.18E-03
Silver **	5.37E-03
Strontium	1.51E+00
Thallium	5.89E-02
Titanium	9.22E-03
Vanadium	1.76E-03
Zinc *	-
LPAHs	0.00E+00
HPAH *	-
Total PAHs *	-

NOTES:
* Total Intake for the COPEC includes all three exposure pathways.
** COPEC was measured in crab tissue and water, but not in sediment.
*** Expressed in dry weight.

TABLE I-5
INTAKE CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (GREEN HERON)

SEDIMENT INGESTION

INTAKE = (Sc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Sc	Sediment concentration (mg/kg)	see Table I-1	
IR	Maximum Ingestion rate of sed (kg/day)***	1.88E-06	EPA, 1993
AF	Chemical Bioavailability in sediment (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Sc	Intake
4,4'-DDD	2.00E-02	2.12E-07
4,4'-DDT	1.10E-02	1.17E-07
Benzo(b)fluoranthene	3.38E-02	3.59E-07
Benzo(g,h,i)perylene	1.59E-02	1.69E-07
Benzo(k)fluoranthene	2.75E-02	2.92E-07
Cadmium	1.90E-01	2.02E-06
Chrysene	1.40E-02	1.49E-07
Copper	2.02E+01	2.14E-04
Nickel	1.84E+01	1.95E-04
Pyrene	1.96E-02	2.08E-07
Zinc	9.61E+02	1.02E-02
HPAH	1.11E-01	1.18E-06
TOTAL PAHs	1.11E-01	1.18E-06

SURFACE WATER INGESTION

INTAKE = (Wc * IR * AF * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Wc	Surface Water concentration (mg/kg)	see Table I-1	
IR	Maximum Ingestion rate of water (L/day)	2.09E-02	EPA, 1993
AF	Chemical Bioavailability in water (unitless)	1	EPA, 1997
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Wc	Intake
4-Chloroaniline	8.23E-04	9.71E-05
Aluminum	2.22E+00	2.62E-01
Antimony	7.60E-03	8.97E-04
Arsenic	1.30E-02	1.53E-03
Barium	1.90E-01	2.24E-02
Benzo(a)pyrene	3.48E-04	4.11E-05
Benzo(b)fluoranthene	1.81E-03	2.14E-04
Benzo(g,h,i)perylene	1.73E-03	2.04E-04
Benzo(k)fluoranthene	5.42E-04	6.39E-05
Bis(2-ethylhexyl)phthalate	4.00E-02	4.72E-03
Boron	3.52E+00	4.15E-01
Chromium	1.50E-03	1.77E-04
Chromium VI	1.60E-02	1.89E-03
Chrysene	7.10E-04	8.38E-05
Cobalt	3.20E-03	3.78E-04
Dibenz(a,h)anthracene	3.04E-03	3.59E-04
Di-n-butyl Phthalate	3.81E-03	4.49E-04
Indeno(1,2,3-cd)pyrene	3.44E-03	4.06E-04
Iron	6.67E+00	7.87E-01
Lead	1.10E-02	1.30E-03
Lithium	1.60E-01	1.89E-02
Manganese	1.44E+00	1.70E-01
Molybdenum	1.80E-02	2.12E-03
Nickel	7.90E-03	9.32E-04
Selenium	9.80E-03	1.16E-03
Silver	1.50E-02	1.77E-03
Strontium	7.19E+00	8.48E-01
Thallium	7.70E-03	9.08E-04
Titanium	4.40E-02	5.19E-03
Vanadium	8.40E-03	9.91E-04
Zinc	6.30E-01	7.43E-02
LPAHs	0.00E+00	0.00E+00
HPAHs	1.16E-02	1.37E-03
Total PAHs	2.64E-03	3.11E-04

TABLE I-5
INTAKE CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (GREEN HERON)

FOOD INGESTION

INTAKE = ((Cc * IR * Dfc * AUF)/(BW) + (Cw * IR * DFw * AUF) / (BW)

Parameter	Definition	Value	Reference
Intake	Intake of chemical (mg/kg-day)	calculated	
Cc	Crab concentration (mg/kg)	see Table I-8	
Cw	Worm concentration (mg/kg)	see Table I-8	
IR	Maximum Ingestion rate of of food (kg/day)***	9.40E-05	EPA, 1993
Dfc	Dietary fraction of crabs (unitless)	2.50E-01	Kent, 1986
Dff	Dietary fraction of fish (unitless)	7.50E-01	Kent, 1986
AUF	Default Area Use Factor	1	EPA, 1997
BW	Minimum Body weight (kg)	1.77E-01	EPA, 1993

Chemical	Crab	Fish	Intake
4,4'-DDD	3.73E-03	1.16E-02	5.11E-06
4,4'-DDT	2.98E-03	6.38E-03	2.93E-06
Benzo(b)fluoranthene	2.29E-01	2.23E-02	3.93E-05
Benzo(g,h,i)perylene	1.59E-02	1.05E-02	6.29E-06
Benzo(k)fluoranthene	1.96E-01	1.82E-02	3.32E-05
Cadmium	1.90E-01	1.90E-01	1.01E-04
Chrysene	1.49E-01	9.24E-03	2.35E-05
Copper	2.02E+01	2.02E+01	1.07E-02
Nickel	9.94E-01	9.94E-01	5.27E-04
Pyrene	1.96E-02	1.29E-02	7.75E-06
Zinc	1.10E+03	1.10E+03	5.81E-01
HPAH	2.29E-01	7.31E-02	5.95E-05
TOTAL PAHs	2.29E-01	7.31E-02	5.95E-05
4-Chloroaniline	0.00E+00	8.23E-04	3.28E-07
Aluminum	0.00E+00	5.99E+00	2.39E-03
Antimony	0.00E+00	3.04E-01	1.21E-04
Arsenic	0.00E+00	1.48E+00	5.90E-04
Barium	0.00E+00	1.20E+02	4.79E-02
Benzo(a)pyrene	0.00E+00	1.74E-01	6.93E-05
Benzo(b)fluoranthene	0.00E+00	9.05E-01	3.60E-04
Benzo(g,h,i)perylene	0.00E+00	1.73E-03	6.89E-07
Benzo(k)fluoranthene	0.00E+00	2.71E-01	1.08E-04
Bis(2-ethylhexyl)phthalate	0.00E+00	2.80E+00	1.11E-03
Boron	0.00E+00	3.52E+00	1.40E-03
Chromium	0.00E+00	2.85E-02	1.13E-05
Chromium VI	0.00E+00	3.04E-01	1.21E-04
Chrysene	0.00E+00	3.55E-01	1.41E-04
Cobalt	0.00E+00	3.20E-03	1.27E-06
Dibenz(a,h)anthracene	0.00E+00	1.52E+00	6.05E-04
Di-n-butyl Phthalate	0.00E+00	3.58E+01	1.43E-02
Indeno(1,2,3-cd)pyrene	0.00E+00	1.72E+00	6.85E-04
Iron	0.00E+00	6.67E+00	2.66E-03
Lead	0.00E+00	9.90E-04	3.94E-07
Lithium	0.00E+00	1.60E-01	6.37E-05
Manganese	0.00E+00	1.44E+00	5.73E-04
Molybdenum	0.00E+00	1.80E-02	7.17E-06
Nickel	0.00E+00	6.16E-01	2.45E-04
Selenium	0.00E+00	1.26E+00	5.03E-04
Silver **	5.30E-02	1.32E+00	5.31E-04
Strontium	0.00E+00	7.19E+00	2.86E-03
Thallium	0.00E+00	7.70E+01	3.07E-02
Titanium	0.00E+00	4.40E-02	1.75E-05
Vanadium	0.00E+00	8.40E-03	3.34E-06
Zinc	0.00E+00	1.30E+03	5.16E-01
LPAHs	0.00E+00	0.00E+00	0.00E+00
HPAHs	0.00E+00	1.16E-02	4.63E-06
Total PAHs	0.00E+00	2.64E-03	1.05E-06

TABLE I-5
INTAKE CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (GREEN HERON)

TOTAL INTAKE

INTAKE = Sediment Intake +Water Intake + Food Intake

Chemical	Total Intake
4,4'-DDD	5.33E-06
4,4'-DDT	3.05E-06
Benzo(b)fluoranthene *	2.53E-04
Benzo(g,h,i)perylene *	2.11E-04
Benzo(k)fluoranthene *	9.75E-05
Cadmium	1.03E-04
Chrysene *	1.07E-04
Copper	1.09E-02
Nickel *	1.65E-03
Pyrene	7.96E-06
Zinc *	6.66E-01
HPAH *	6.07E-05
Total PAHs *	1.43E-03
4-Chloroaniline	9.74E-05
Aluminum	2.64E-01
Antimony	1.02E-03
Arsenic	2.12E-03
Barium	7.03E-02
Benzo(a)pyrene	1.10E-04
Benzo(b)fluoranthene *	-
Benzo(g,h,i)perylene *	-
Benzo(k)fluoranthene *	-
Bis(2-ethylhexyl)phthalate	5.83E-03
Boron	4.17E-01
Chromium	1.88E-04
Chromium VI	2.01E-03
Chrysene *	-
Cobalt	3.79E-04
Dibenz(a,h)anthracene	9.64E-04
Di-n-butyl Phthalate	1.47E-02
Indeno(1,2,3-cd)pyrene	1.09E-03
Iron	7.90E-01
Lead	1.30E-03
Lithium	1.89E-02
Manganese	1.70E-01
Molybdenum	2.13E-03
Nickel *	-
Selenium	1.66E-03
Silver **	2.30E-03
Strontium	8.51E-01
Thallium	3.16E-02
Titanium	5.21E-03
Vanadium	9.94E-04
Zinc *	-
LPAHs	0.00E+00
HPAH *	-
Total PAHs *	-

NOTES:
Shaded rows are the exposure parameters to be used in the Refinement Step 3a of the ERA process. Ingestion rate equations, inclusive of body weight, are the same as those used in pre-Refinement calculations.
* Total Intake for the COPEC includes all three exposure pathways.
** COPEC was measured in crab tissue and water, but not in sediment.
*** Expressed in dry weight.

TABLE I-6
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (SANDPIPER)

Ecological Hazard Quotient = Total Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table I-2

Chemical	**Total Intake**	**TRV Sandpiper**		**EHQ**
4,4'-DDD	1.23E-05	2.27E-01	<	5.42E-05
4,4'-DDT	7.07E-06	2.27E-01	<	3.11E-05
Benzo(b)fluoranthene	4.86E-04			
Benzo(g,h,i)perylene	3.82E-04			
Benzo(k)fluoranthene	2.04E-04			
Cadmium	4.13E-04	1.47E+00	<	2.81E-04
Chrysene	2.24E-04			
Copper	1.28E-02	4.05E+00		3.17E-03
Nickel	1.31E-02	6.71E+00		1.95E-03
Pyrene	2.52E-05			
Zinc	9.16E-01	6.61E+01		1.39E-02
HPAH	2.61E-03			
TOTAL PAHs	7.33E-04			
4-Chloroaniline	1.73E-04			
Aluminum	4.94E+00	1.00E+02		4.94E-02
Antimony	1.62E-03			
Arsenic	3.19E-03	2.46E+00		1.30E-03
Barium	5.86E-02	2.08E+01		2.82E-03
Benzo(a)pyrene	8.83E-04	1.00E+00		8.83E-04
Benzo(b)fluoranthene	-			
Benzo(g,h,i)perylene	-			
Benzo(k)fluoranthene	-			
Bis(2-ethylhexyl)phthalate	1.47E-02	1.11E+02		1.32E-04
Boron	7.38E-01			
Chromium	2.54E-03	1.00E+00		2.54E-03
Chromium VI	2.71E-02	1.00E+00		2.71E-02
Chrysene	-			
Cobalt	6.71E-04			
Dibenz(a,h)anthracene	1.71E-03	3.90E-01		4.37E-03
Di-n-butyl Phthalate	1.20E-02			
Indeno(1,2,3-cd)pyrene	8.73E-03	1.00E+00		8.73E-03
Iron	1.40E+00			
Lead	2.99E-02	2.50E-02		1.20E+00
Lithium	3.35E-02			
Manganese	3.02E-01			
Molybdenum	3.77E-03			
Nickel	-			
Selenium	8.18E-03	5.00E-01		1.64E-02
Silver	5.37E-03	1.78E+02		3.02E-05
Strontium	1.51E+00			
Thallium	5.89E-02	3.50E-01		1.68E-01
Titanium	9.22E-03			
Vanadium	1.76E-03			
Zinc	-			
LPAHs	0.00E+00			
HPAHs	-			
Total PAHs	-			

Notes:
Shading indicates HQ > 1.

TABLE I-7
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR POND SEDIMENT
Avian Carnivore (GREEN HERON)

Ecological Hazard Quotient = Total Intake / TRV

Parameter	Definition	Default
Total Intake	Intake of COPEC (mg/kg-day)	see Intake
TRV	Toxicity Reference Value (mg/kg)	see Table I-2

Chemical	Total Intake	TRV Green Heron		EHQ
4,4'-DDD	5.33E-06	2.27E-01	<	2.35E-05
4,4'-DDT	3.05E-06	2.27E-01	<	1.34E-05
Benzo(b)fluoranthene	2.53E-04			
Benzo(g,h,i)perylene	2.11E-04			
Benzo(k)fluoranthene	9.75E-05			
Cadmium	1.03E-04	1.47E+00	<	7.00E-05
Chrysene	1.07E-04			
Copper	1.09E-02	4.05E+00		2.70E-03
Nickel	1.65E-03	6.71E+00		2.47E-04
Pyrene	7.96E-06			
Zinc	6.66E-01	6.61E+01		1.01E-02
HPAH	6.07E-05			
TOTAL PAHs	1.43E-03			
4-Chloroaniline	9.74E-05			
Aluminum	2.64E-01	1.00E+02		2.64E-03
Antimony	1.02E-03			
Arsenic	2.12E-03	2.46E+00		8.63E-04
Barium	7.03E-02	2.08E+01		3.38E-03
Benzo(a)pyrene	1.10E-04	1.00E+00		1.10E-04
Benzo(b)fluoranthene	-			
Benzo(g,h,i)perylene	-			
Benzo(k)fluoranthene	-			
Bis(2-ethylhexyl)phthalate	5.83E-03	1.11E+02		5.26E-05
Boron	4.17E-01			
Chromium	1.88E-04	1.00E+00		1.88E-04
Chromium VI	2.01E-03	1.00E+00		2.01E-03
Chrysene	-			
Cobalt	3.79E-04			
Dibenz(a,h)anthracene	9.64E-04	3.90E-01		2.47E-03
Di-n-butyl Phthalate	1.47E-02			
Indeno(1,2,3-cd)pyrene	1.09E-03	1.00E+00		1.09E-03
Iron	7.90E-01			
Lead	1.30E-03	2.50E-02		5.19E-02
Lithium	1.89E-02			
Manganese	1.70E-01			
Molybdenum	2.13E-03			
Nickel	-			
Selenium	1.66E-03	5.00E-01		3.32E-03
Silver	2.30E-03	1.78E+02		1.29E-05
Strontium	8.51E-01			
Thallium	3.16E-02	3.50E-01		9.02E-02
Titanium	5.21E-03			
Vanadium	9.94E-04			
Zinc	-			
LPAHs	0.00E+00			
HPAHs	-			
Total PAHs	-			

TABLE I-8
CONCENTRATION OF CHEMICAL IN FOOD ITEM (mg/kg)

Cfood = Csed x BSAF (or BSAF or BCF with food chain multiplier)

where:

Cfood =	Chemical Concentration in food (mg/kg dry)
Csed =	Chemical Concentration in soil (mg/kg dry)
BSAF =	Biota to Sediment Accumulation Factor (unitless)
BCF =	Bioconcentration Factor (unitless)

Compound	Csed (mg/kg)	Sediment to Worm BSAF	Worm Concentration	Reference	Sediment to Crab BSAF	Crab Concentration	Reference	Sediment to Fish BSAF	Fish Concentration	Reference
4,4'-DDD	2.00E-02	8.00E-01	1.60E-02	BSAF DB	*	3.73E-03	*	5.80E-01	1.16E-02	WSDOH, 1995
4,4'-DDT	1.10E-02	8.00E-01	8.80E-03	BSAF DB	*	2.98E-03	*	5.80E-01	6.38E-03	WSDOH, 1995
Benzo(b)fluoranthene	3.38E-02	1.61E+00	5.44E-02	EPA, 1999	*	2.29E-01	*	6.60E-01	2.23E-02	WSDOH, 1995
Benzo(g,h,i)perylene	1.59E-02	1.61E+00	2.56E-02	EPA, 1999	1.00E+00	1.59E-02	**	6.60E-01	1.05E-02	WSDOH, 1995
Benzo(k)fluoranthene	2.75E-02	1.61E+00	4.43E-02	EPA, 1999	*	1.96E-01	*	6.60E-01	1.82E-02	WSDOH, 1995
Cadmium	1.90E-01	3.40E+00	6.46E-01	EPA, 1999	1.00E+00	1.90E-01	**	1.00E+00	1.90E-01	**
Chrysene	1.40E-02	3.43E+00	4.80E-02	BSAF DB	*	1.49E-01	*	6.60E-01	9.24E-03	WSDOH, 1995
Copper	2.02E+01	3.00E-01	6.05E+00	EPA, 1999	1.00E+00	2.02E+01	**	1.00E+00	2.02E+01	Max value from Calcasieu RI
Nickel	1.84E+01	9.00E-01	1.66E+01	EPA, 1999	5.40E-02	9.94E-01	Max value from Calcasieu RI	5.40E-02	9.94E-01	Max value from Calcasieu RI
Pyrene	1.96E-02	1.61E+00	3.16E-02	EPA, 1999	1.00E+00	1.96E-02	**	6.60E-01	1.29E-02	WSDOH, 1995
Zinc	9.61E+02	5.70E-01	5.48E+02	EPA, 2003	1.14E+00	1.10E+03	Max value from Calcasieu RI	1.14E+00	1.10E+03	Max value from Calcasieu RI
HPAH	1.11E-01	1.61E+00	1.78E-01	EPA, 1999	-	2.29E-01	max PAH	6.60E-01	7.31E-02	WSDOH, 1995
TOTAL PAHs	1.11E-01	1.61E+00	1.78E-01	EPA, 1999	-	2.29E-01	max PAH	6.60E-01	7.31E-02	WSDOH, 1995

Compound	Cwtr - max (mg/L)	Water to Worm BCF	Worm Concentration	Reference	Water to Crab BCF	Crab Concentration	Reference	Water to Fish BCF	Fish Concentration	Reference
4-Chloroaniline	8.23E-04	1.00E+00	8.23E-04	EPA, 1997	-	0.00E+00	*+	1.00E+00	8.23E-04	EPA, 1997
Aluminum	2.22E+00	4.07E+03	9.03E+03	EPA, 1999	-	0.00E+00	*+	2.70E+00	5.99E+00	EPA, 1999
Antimony	7.60E-03	7.00E+00	5.32E-02	EPA, 1999	-	0.00E+00	*+	4.00E+01	3.04E-01	EPA, 1999
Arsenic	1.30E-02	7.30E+01	9.49E-01	EPA, 1999	-	0.00E+00	*+	1.14E+02	1.48E+00	EPA, 1999
Barium	1.90E-01	2.00E+02	3.80E+01	EPA, 1999	-	0.00E+00	*+	6.33E+02	1.20E+02	EPA, 1999
Benzo(a)pyrene	3.48E-04	4.70E+03	1.63E+00	EPA, 1999	-	0.00E+00	*	5.00E+02	1.74E-01	EPA, 1999
Benzo(b)fluoranthene	1.81E-03	4.70E+03	8.50E+00	EPA, 1999	-	0.00E+00	*	5.00E+02	9.05E-01	EPA, 1999
Benzo(g,h,i)perylene	1.73E-03	1.00E+00	1.73E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	1.73E-03	EPA, 1997
Benzo(k)fluoranthene	5.42E-04	1.32E+04	7.17E+00	EPA, 1999	-	0.00E+00	*	5.00E+02	2.71E-01	EPA, 1999
Bis(2-ethylhexyl)phthalate	4.00E-02	3.18E+02	1.27E+01	EPA, 1999	-	0.00E+00	*+	7.00E+01	2.80E+00	EPA, 1999
Boron	3.52E+00	1.00E+00	3.52E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	3.52E+00	EPA, 1997
Chromium	1.50E-03	3.00E+03	4.50E+00	EPA, 1999	-	0.00E+00	*+	1.90E+01	2.85E-02	EPA, 1999
Chromium VI	1.60E-02	3.00E+03	4.80E+01	EPA, 1999	-	0.00E+00	*+	1.90E+01	3.04E-01	EPA, 1999
Chrysene	7.10E-04	9.80E+02	6.96E-01	EPA, 1999	-	0.00E+00	*+	5.00E+02	3.55E-01	EPA, 1999
Cobalt	3.20E-03	1.00E+00	3.20E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	3.20E-03	EPA, 1997
Dibenz(a,h)anthracene	3.04E-03	7.10E+02	2.16E+00	EPA, 1999	-	0.00E+00	*	5.00E+02	1.52E+00	EPA, 1999
Di-n-butyl Phthalate	3.81E-03	5.95E+03	2.27E+01	EPA, 1999	-	0.00E+00	*+	9.40E+03	3.58E+01	EPA, 1999
Indeno(1,2,3-cd)pyrene	3.44E-03	4.70E+03	1.62E+01	EPA, 1999	-	0.00E+00	*	5.00E+02	1.72E+00	EPA, 1999
Iron	6.67E+00	1.00E+00	6.67E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	6.67E+00	EPA, 1997
Lead	1.10E-02	5.06E+03	5.56E+01	EPA, 1999	-	0.00E+00	*	9.00E-02	9.90E-04	EPA, 1999
Lithium	1.60E-01	1.00E+00	1.60E-01	EPA, 1997	-	0.00E+00	*+	1.00E+00	1.60E-01	EPA, 1997
Manganese	1.44E+00	1.00E+00	1.44E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	1.44E+00	EPA, 1997
Molybdenum	1.80E-02	1.00E+00	1.80E-02	EPA, 1997	-	0.00E+00	*+	1.00E+00	1.80E-02	EPA, 1997
Nickel	7.90E-03	2.80E+01	2.21E-01	EPA, 1999	-	0.00E+00	*+	7.80E+01	6.16E-01	EPA, 1999
Selenium	9.80E-03	1.26E+03	1.24E+01	EPA, 1999	-	0.00E+00	*+	1.29E+02	1.26E+00	EPA, 1999
Silver	1.50E-02	2.98E+02	4.47E+00	EPA, 1999	-	>0.053	***	8.77E+01	1.32E+00	EPA, 1999
Strontium	7.19E+00	1.00E+00	7.19E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	7.19E+00	EPA, 1997
Thallium	7.70E-03	1.50E+04	1.16E+02	EPA, 1999	-	0.00E+00	*+	1.00E+04	7.70E+01	EPA, 1999
Titanium	4.40E-02	1.00E+00	4.40E-02	EPA, 1997	-	0.00E+00	*+	1.00E+00	4.40E-02	EPA, 1997
Vanadium	8.40E-03	1.00E+00	8.40E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	8.40E-03	EPA, 1997
Zinc	6.30E-01	4.58E+03	2.88E+03	EPA, 1999	-	0.00E+00	*+	2.06E+03	1.30E+03	EPA, 1999
LPAHs	0.00E+00	1.00E+00	0.00E+00	EPA, 1997	-	0.00E+00	*+	1.00E+00	0.00E+00	EPA, 1997
HPAHs	1.16E-02	1.00E+00	1.16E-02	EPA, 1997	-	0.00E+00	*+	1.00E+00	1.16E-02	EPA, 1997
Total PAHs	2.64E-03	1.00E+00	2.64E-03	EPA, 1997	-	0.00E+00	*+	1.00E+00	2.64E-03	EPA, 1997

Notes:

* These compounds were analyzed but not detected in any blue crab samples collected at the Site; so value is one-half of maximum detection limit.

*+ These compounds were not included in crab tissue analysis per the approved Sampling & Analysis Plan.

** If no BAF or BCF was available in the literature, a default value of 1.0 was used.

*** COPEC was measured in crab tissue and surface water, but not in sediment.

TABLE I-9
ECOLOGICAL HAZARD QUOTIENT CALCULATIONS FOR POND SEDIMENT
POLYCHAETES -- MIDPOINT BETWEEN ERL AND ERM COMPARISON

Ecological Hazard Quotient = Sc/TRV

Parameter	Definition	Default
Sc	Sediment Concentration (mg/kg)	see below
TRV	Toxicity Reference Value (mg/kg)	see TRV summary page

Chemical	Exposure Point Concentration* (Sc)	TRV polychaetes	Maximum EHQ+
4,4'-DDD	6.76E-04	3.20E-02	2.11E-02
4,4'-DDT	1.57E-03	3.20E-02	4.90E-02
Benzo(b)fluoranthene	1.06E-01	1.80E+00	5.89E-02
Benzo(g,h,i)perylene	1.35E-01	6.70E-01	2.01E-01
Benzo(k)fluoranthene	1.30E-01	1.80E+00	7.22E-02
Cadmium	2.70E-01	5.40E+00	5.00E-02
Chrysene	2.57E-02	1.59E+00	1.61E-02
Copper	2.68E+01	1.52E+02	1.76E-01
Nickel	2.06E+01	3.63E+01	5.68E-01
Pyrene	2.65E-02	1.63E+00	1.62E-02
Zinc	9.99E+02	2.80E+02	3.57E+00
HPAH	1.11E-01	5.65E+00	1.96E-02
TOTAL PAHs	1.11E-01	2.44E+01	4.54E-03

Notes:
*EPC for benthic receptors is maximum measured concentration.
+Shading indicates HQ > 1.

APPENDIX J
REFERENCES FOR THE APPENDICES

APPENDIX J – REFERENCES FOR APPENDICES

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United States Environmental Protection Agency (EPA), 2007d. *Ecological Soil Screening Levels for Nickel. Interim Final.* Office of Solid Waste and Emergency Response. OSWER Directive 9285.7-76. March.

United States Environmental Protection Agency (EPA), 2007e. *Ecological Soil Screening Levels for Zinc.* Office of Solid Waste and Emergency Response. OSWER Directive 9285.7-73. June.

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APPENDIX K
SITE SOIL BIOLOGICAL ACTIVITY CONSIDERATIONS
(APPENDIX C FROM PHASE 1 SOIL INVESTIGATION DATA AND PROPOSED PHASE 2 SOIL INVESTIGATION ACTIVITIES LETTER TO EPA FROM PBW, LLC ON SEPTEMBER 11, 2007)

APPENDIX C

SITE SOIL BIOLOGICAL ACTIVITY CONSIDERATIONS

The coastal uplands of the central Texas coast generally support a variety of burrowing wildlife, and an assortment of animals that rely on the burrowers for abandoned tunnels. Burrowing animals observed at the Gulfco site (the Site) include field mice, rat snakes, fiddler crabs, and ghost crabs. The distribution of burrowing organisms is typically restricted by the availability of food and soil characteristics. Most species of burrowing mammals, reptiles and crustaceans prefer to excavate their tunnels in sandy loam or sandy clay, and have limited success in hard compacted surface soils or soils containing rocks and shell (Crane, 1975)(Grimes, et al., 1989).

Shallow soil borings advanced to depths of approximately two feet or more at the Gulfco Marine Maintenance Site indicate that approximately 80% of the surface or near surface soil at the Site (i.e. the portion of the Site not covered by concrete slabs or gravel/shell road base material) is composed of compacted clay, shell hash, and brick fragments that would tend to inhibit burrowing activity. Soil borings were advanced at 99 locations as part of the shallow soil sampling program. Shallow soils at 81 of these locations were characterized as either compacted fill material (typically described as varying combinations of sand, clay, gravel, oyster shell, and/or brick fragments) or firm clays that would be difficult for borrowing animals to excavate. The probability that burrowing wildlife would utilize the compacted soils is low. Small burrowing animals typically avoid hard compacted surfaces (Crane, 1975)(Grimes, et al., 1989).

Studies have shown that the average burrow depth and depth of bioturbation for burrowing organisms (intertidal and supratidal) is 9.8 cm (approximately four inches). This includes a large number of shallow burrowing species and a few species that burrow to 60 cm (approximately 24 inches) (Boudreau 1998; Kristensen, and Kostka, 2004).

The following paragraphs provide descriptions of some of the wildlife that could potentially inhabit the soils at the Gulfco Site. None of the wildlife described here are likely to utilize the hard compacted surface soils covering a portion of the Site, or the clay dominated subsurface soils found under most of the Site. Scientific studies indicate that most of the small burrowing mammals, crustaceans, and reptiles found in Texas coastal habitats prefer soft sandy surface soils and are restricted by soil composition and compaction, to the upper 24 inches of soil (Kristensen and Kostka 2004).

It should be noted that the wildlife discussed below were chosen based on the terrestrial receptors of concern identified for the Site in the Screening Level Ecological Risk Assessment (SLERAA)(PBW, 2005). If the receptor of concern (ROC) for a given guild does not burrow, an alternative animal has been included to ensure that all guilds that may contain burrowing species have been evaluated. The fiddler crab is also included because it has been observed along and north of Marlin Avenue and because it may burrow in the more moist soils at the Site.

Detritivores, Invertebrates, and Terrestrial Plants

Earthworms (*Lumbricus terrestris*)

The earthworm was chosen as the ROC in the SLERA (PBW, 2005) for the detritivores and invertebrates at the Site. Earthworms burrow into all types of soil but are most effective in loamy soil. Burrows are continuous from surface opening to a maximum depth of 40 cm (~16 in) and have few interconnections (Daane, et al., 1997). Earthworms loosen soil by excavating winding burrows through the soil, and leaving a trail of partially digested organic detritus and nutrients. The burrows promote water percolation and allow oxygen to penetrate deeper soil layers.

Mammalian Herbivores and Omnivores

Deer mouse (*Peromyscus maniculatus)*

The omnivorous deer mouse was chosen as the ROC for the various feeding guilds of small mammals at the Site. In Texas, deer mice usually inhabit grasslands or areas of open brush. Deer mice are not burrowers but build their nest from grasses in protected areas above ground beneath debris, in tree cavities, in rotting logs, or in abandoned burrows. They are almost strictly nocturnal.

Their food consists primarily of seeds and insect larvae. They will eat fruits, bark, roots, and herbage. In spring they will eat large numbers of lepidopteran (moths and butterflies) larvae and other insect larvae. Deer mice are an important source of food for many small carnivores, owls, and snakes.

Since deer mice do not burrow, the following mammalian species were also considered for their burrowing habits although none are known to reside at the Site.

Mexican ground squirrel (*Spermophilus mexicanus*)

The Mexican ground squirrel ranges from Northern Mexico to the Gulf coast of Texas, extending to western and central Texas and into southeastern New Mexico (Young and Jones, 1982). The species inhabits level grasslands and typically avoids rocky soils. It is typically found in sandy regions of coastal savannas. The species is well adapted for digging and burrowing and makes its home in underground burrows. An individual may occupy more than one burrow, with many escape burrows in addition to the home. The home burrows are 60 to 80 mm in diameter and reach a depth of 125 mm (~5 in), while the refuge and escape burrows are not as deep (Young and Jones, 1982; Edwards, 1946).

The Mexican Ground Squirrel is omnivorous and like other ground squirrels is adapted for life on the ground foraging for seeds, nuts, roots, bulbs, plant stems, leaves, mice, insects and eggs (Walker, 1975). *S. mexicanus* is typically active and feeds during the day. The food habits vary seasonally. In the spring the diet is distinctively herbivorous, consisting of seeds and leaves, nuts and fruits. However, in the early summer, half the diet is composed of insects commonly encountered in the burrows.

Nine-banded armadillo (*Dasypus novemcinctus*)

The preferred habitats of the nine-banded armadillo are drier areas including wire-grass prairie, abandoned fields, shrubs, and cultivated fields (Neill, 1952). The nine-banded armadillo is most successful in riparian habitats with rich organic litter (Humphrey, 1974). The armadillo is an opportunistic species that flourishes in communities that are disrupted by tree harvesting, cattle grazing, and agricultural crops. The most important economic benefits from the nine-banded armadillo are its predation on agricultural pests such as the scarabid beetles and other insects (Fitch et al., 1952). Other positive impacts of armadillo include the predation on venomous snakes, creation of shelters for other wildlife, and soil fertilization. Armadillos prefer to dig their burrows in sandy soils and avoid digging into hard clay.

Attwater's pocket gopher (*Geomys attwateri*)

The pocket gopher inhabits the sandy prairies in coastal Texas where it feeds on plant roots, seeds, and insects. The pocket gopher generally excavates shallow tunnels (<6 in deep) and is responsible for a significant amount of soil turbation in areas where it is abundant (Williams and Cameron, 1986; Rezsutek and Cameron, 2000). The gopher prefers sandy loamy soil and will avoid hard compacted surface soils.

Mammalian Predators

Coyote (*Canis latrans*)

The coyote was selected in the SLERA (PBW, 2005) as the ROC for the mammalian carnivore feeding guild at the Site. Coyotes are opportunistic feeders but most often feed on rabbits, rodents, and carrion (Andelt, 1985), (Windberg and Mitchell, 1990). They typically produce one litter of pups a year and raise the litter in a nursery den (Andelt and Gipson, 1979). Nursery dens are usually located on brush covered slopes, steep banks, thickets, in hollow logs, or on rock ledges. They are also known to den in crevices and shallow caves but they do not normally excavate a den (Bradley and Fagre, 1988), (Roy and Dorrance, 1985).

Coyotes are not typically burrowing mammals nor are any other mammalian predators that may potentially be at the Site such as a bobcat (*Felis rufus*) (Bradley and Fagre, 1988), (Koehler, 1987), or raccoon (*Procyon lotor)* (Chapman and Feldhamer, 1982).

Reptile Predators

Texas rat snake (*Elaphe obsolete*)

This species is a voracious predator on rodents of all sizes, with large adults being able to take prey up to the size of a fox squirrel (*Sciurus niger*). As juveniles, rat snakes will eat small lizards, baby mice, and an occasional small frog. Rat snakes kill their prey by constriction. Texas Ratsnakes also prey on birds and bird eggs; some individuals frequent chicken coops in search of eggs and chicks (Conant and Collins, 1998). Texas Ratsnakes are skilled climbers, able to climb vertical trunks of trees by clinging to cracks in the bark. They are also capable swimmers. Texas Ratsnakes breed in the spring, shortly after emerging from winter hibernation, and lay clutches of 5 to 20 eggs, which hatch in August or September. The female will lay her eggs in a hidden area, under hollow logs or leaves, or in abandoned burrows (Rossi, 1992). The hatchlings of common rat snakes are vigorous eaters and will double their size rather quickly. If conditions are good, females will sometimes produce two clutches of eggs a year. Rat snakes do not burrow but often enter the burrows of rodents in search of food. Rat snakes will use empty burrows for nesting or resting.

Avian Herbivores and Omnivores

American robin (*Turdus migratorius*)

The American robin was selected in the SLERA (PBW, 2005) as the ROC for the avian herbivore and omnivore feeding guild. No small birds at the Site are likely to burrow.

Avian Predators

Red-tailed hawk (*Buteo jamaicensis*)

While the red-tailed hawk was chosen as the ROC for this feeding guild, it does not burrow. Therefore, an alternate species was considered in this analysis.

Burrowing Owl (*Athene cunicularia*)

The burrowing owl utilizes burrows surrounded by short or sparse vegetation, and open terrain. The owls over-winter on the Texas coast in abandoned burrows of ground-dwelling mammals such as ground squirrels and rodents. They select burrows in short vegetation near tall weedy areas, where insects and rodents are most common. This ensures an adequate food supply and allows the owl to see approaching predators (Johnsgard, 1988; Haug et al., 1993). In Texas the owl is probably dependent on the burrowing activities of ground dwelling mammals like gophers, ground squirrels, and armadillos. The owls can also be found on croplands and in roadside culverts. Owls that are attracted to roadside culverts are in danger of being struck by passing vehicles as they enter or leave the culverts (James and Espie, 1997; Haug et al., 1993).

Estuarine Wetland and Aquatic Receptors

Fiddler crabs (*Uca spp.*)

Fiddler crabs eat algae, bacteria, and fungus scraped off of sand particles, and organic detritus (dead and decaying plant and animal matter) that is mixed with sand in the intertidal zone (Williams, 1984; Heard, 1982). Burrows provide privacy for mating, sleeping and "hibernating" during the winter months. Fiddlers also burrow into the sand to escape from predators and abandon their temporary burrow once the danger has passed. During high tide, fiddler crabs pack sand into the entrance to their burrows and wait until the tide retreats. Fiddler crabs improve coastal wetland ecosystems by excavating burrows that aerate the marsh grasses and underwater seagrass.

Two species of fiddler crabs can be found at the Site. Mud fiddler crab (*Uca rapax*) burrows in muddy marsh sediment that is relatively free of plant roots and gravel. The sand fiddler crab (*Uca pugilator*) prefers sandy soils and is generally found near the shoreline. The depth of the burrows is dependent on the stability of the soil/sediment. The density of burrows can be as high as 27 per m^2, and reach depths of 60 cm (23 in) (Teal, 1958)(Grimes, et al., 1989). Most of the crab burrows are shallow and crabs living in sandy silty sediment may be restricted to shallow burrows by the lack of soil stability.

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FIGURES

QUADRANGLE LOCATION

N

Scale in Feet

0 1000 2000

Source:
Base map taken from http://www.tnris.state.tx.us Freeport, Texas 7.5 min. U.S.G.S. quadrangle, 1974.

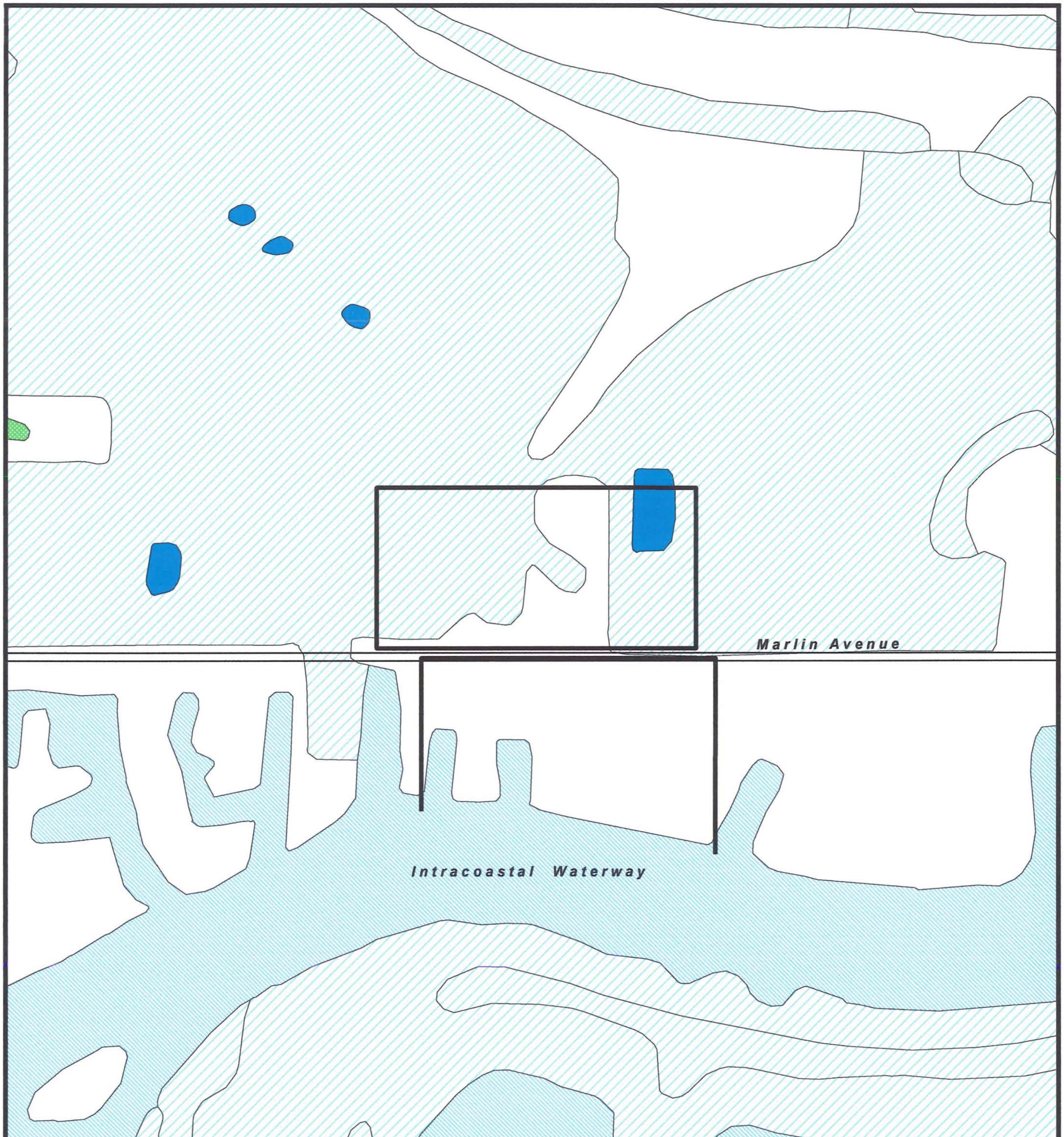
GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 1

SITE LOCATION MAP

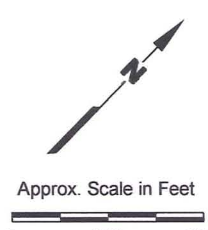
PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: EFP	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



EXPLANATION

- Approx. Site Boundary
- Upland Area
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond



Source:
U.S. Fish & Wildlife Service, Wetlands Online Mapper, 2008.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 2

WETLAND MAP

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: EFP	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

EXPLANATION

IWSE29 ● Sediment Station

IWSW20 △ Surface Water Station

BSS-1 ● Approximate Background Soil Sample Location

Note:
Background fish tissue samples collected from throughout background area.

N

Approx. Scale in Feet

0 125 250

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 3

SOIL AND INTRACOASTAL WATERWAY SEDIMENT AND SURFACE WATER BACKGROUND SAMPLE LOCATIONS

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: EFP	

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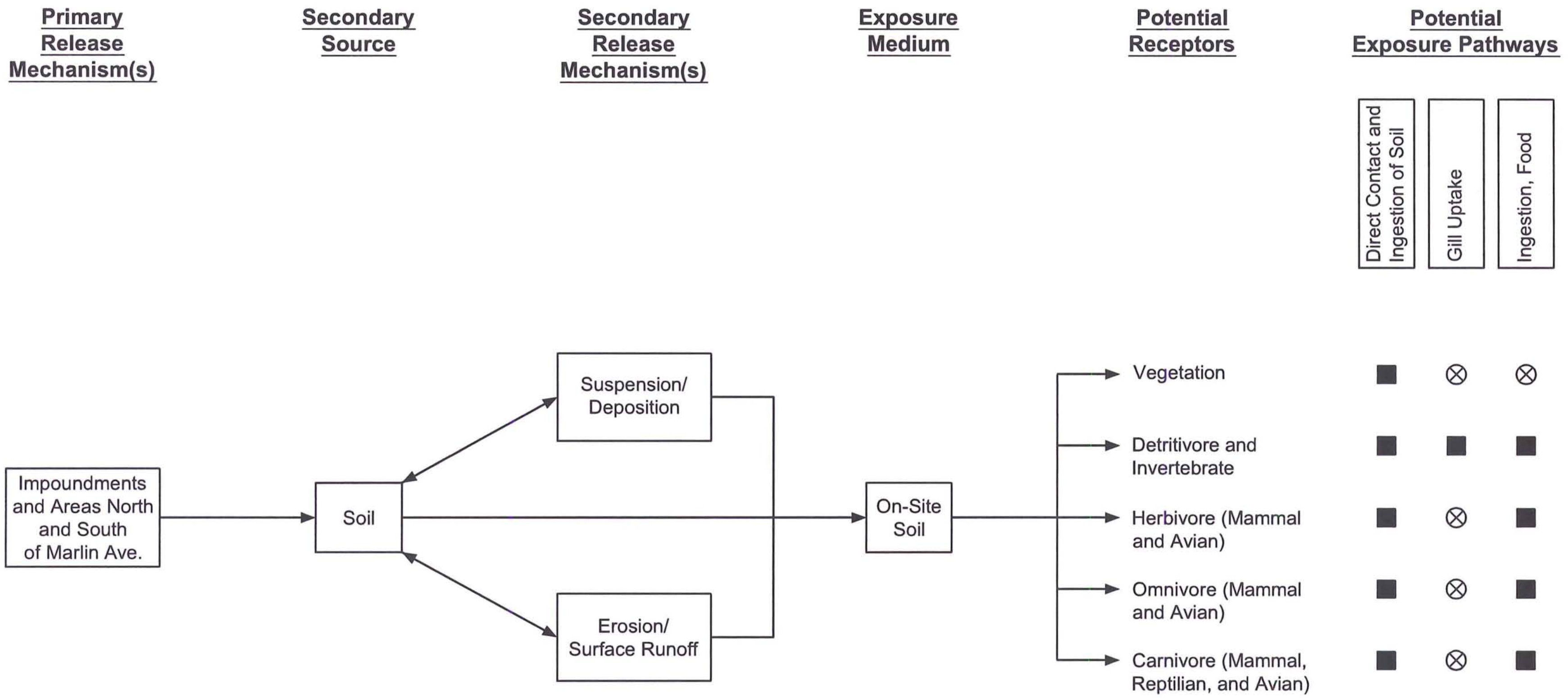

LEGEND

■ Pathway is potentially complete

⊠ Pathway is incomplete

⊗ Pathway is not viable

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 4

TERRESTRIAL ECOSYSTEM CONCEPTUAL SITE MODEL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

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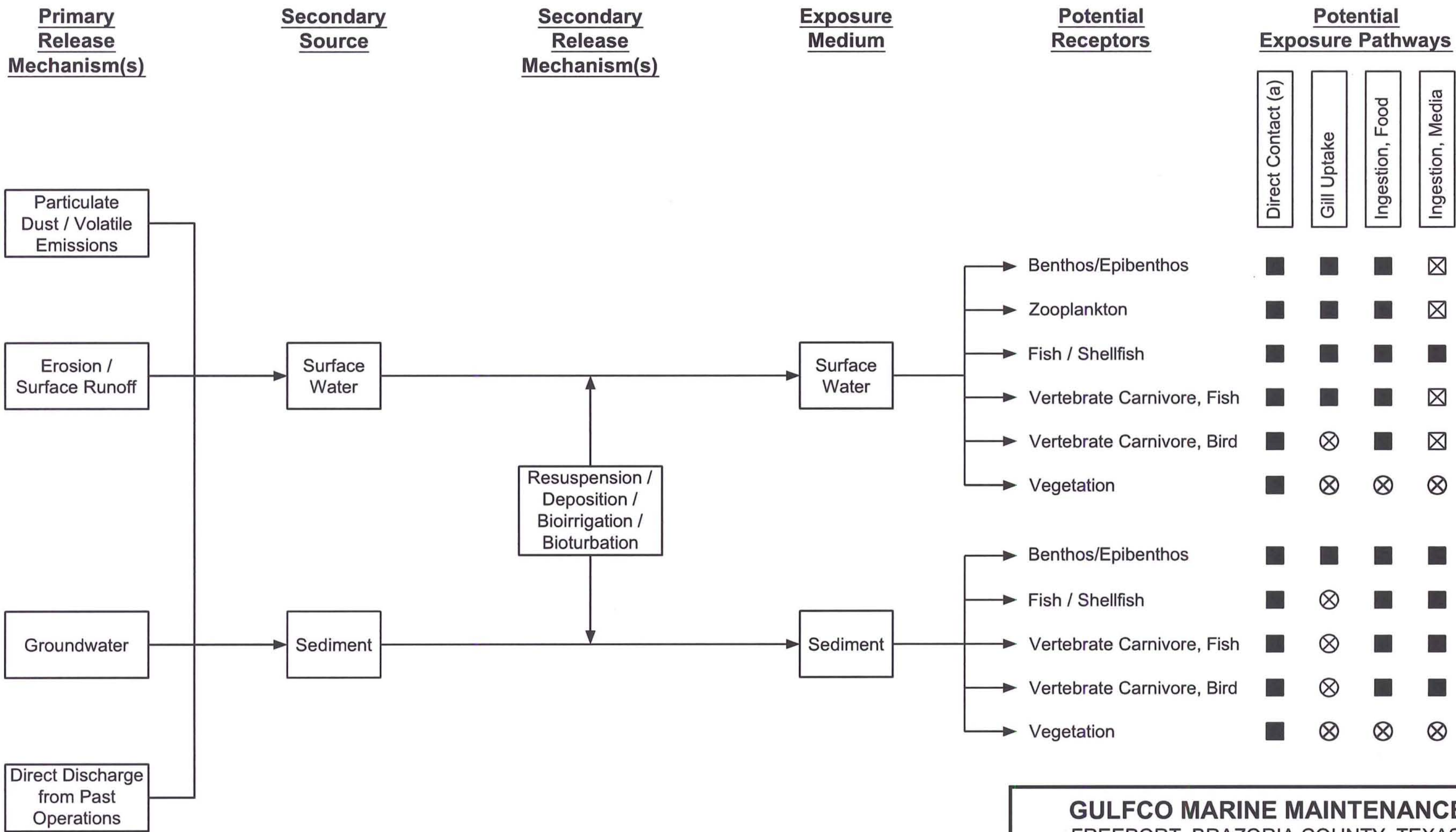

LEGEND

■ Pathway is potentially complete

⊠ Pathway is incomplete

⊗ Pathway is not viable

(a) Direct contact includes dermal absorption

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 5

AQUATIC ECOSYSTEM CONCEPTUAL SITE MODEL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

Shallow Soil Sample (0-2 ft)

Shallow (0-2 ft) and Deep (4-5 ft) Soil Sample

Notes:

1. Data Qualifier: J = Estimated value.
2. BGS = below ground surface.
3. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for background soil data).
4. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Tables 1 & 2).
The screening levels are:
Antimony - 0.27 mg/kg
4,4'-DDT - 0.021 mg/kg
Zinc - 46 mg/kg
Total LPAH - 29 mg/Kg
Total HPAH - 1.1 mg/Kg

Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 6A

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - SOUTH AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

Shallow Soil Sample (0-2 ft)

Shallow (0-2 ft) and Deep (4-5 ft) Soil Sample

Notes:

1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
2. BGS = below ground surface.
3. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for background soil data).
4. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Tables 1 & 2).
The screening levels are:
Boron - 0.5 mg/Kg
Chromium - 0.4 mg/Kg

N

Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 6B

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - SOUTH AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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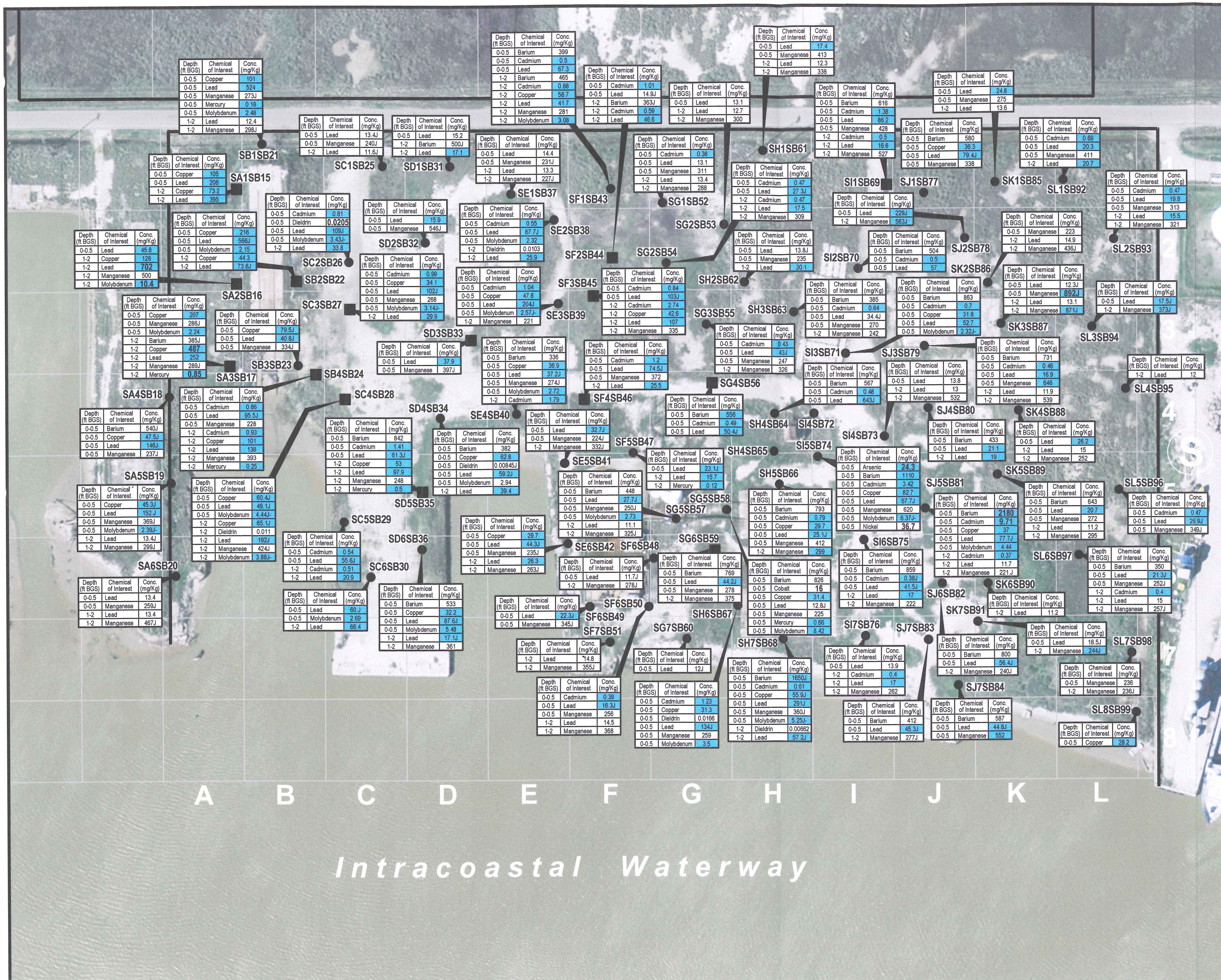

EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- Shallow Soil Sample (0-2 ft)
- Shallow (0-2 ft) and Deep (4-5 ft) Soil Sample

Notes:
1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
2. BGS = below ground surface.
3. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for background soil data).
4. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Tables 1 & 2).

The screening levels are:
Arsenic - 18 mg/Kg
Barium - 330 mg/Kg
Cadmium - 0.36 mg/Kg
Copper - 28 mg/Kg
Dieldrin - 0.0049 mg/Kg
Lead - 11 mg/Kg
Manganese - 220 mg/Kg
Mercury - 0.1 mg/Kg
Molybdenum - 2 mg/Kg
Nickel - 30 mg/Kg

N

Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 6C

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - SOUTH AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

● Shallow Soil Sample (0-2 ft)

■ Shallow (0-2 ft) and Deep (4-5 ft) Soil Sample

Notes:
1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
2. BGS = below ground surface.
3. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Tables 1 & 2).
The screening levels are:
Lithium - 2 mg/Kg
Vanadium - 2 mg/Kg

N

Approx. Scale in Feet
0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 6D

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - SOUTH AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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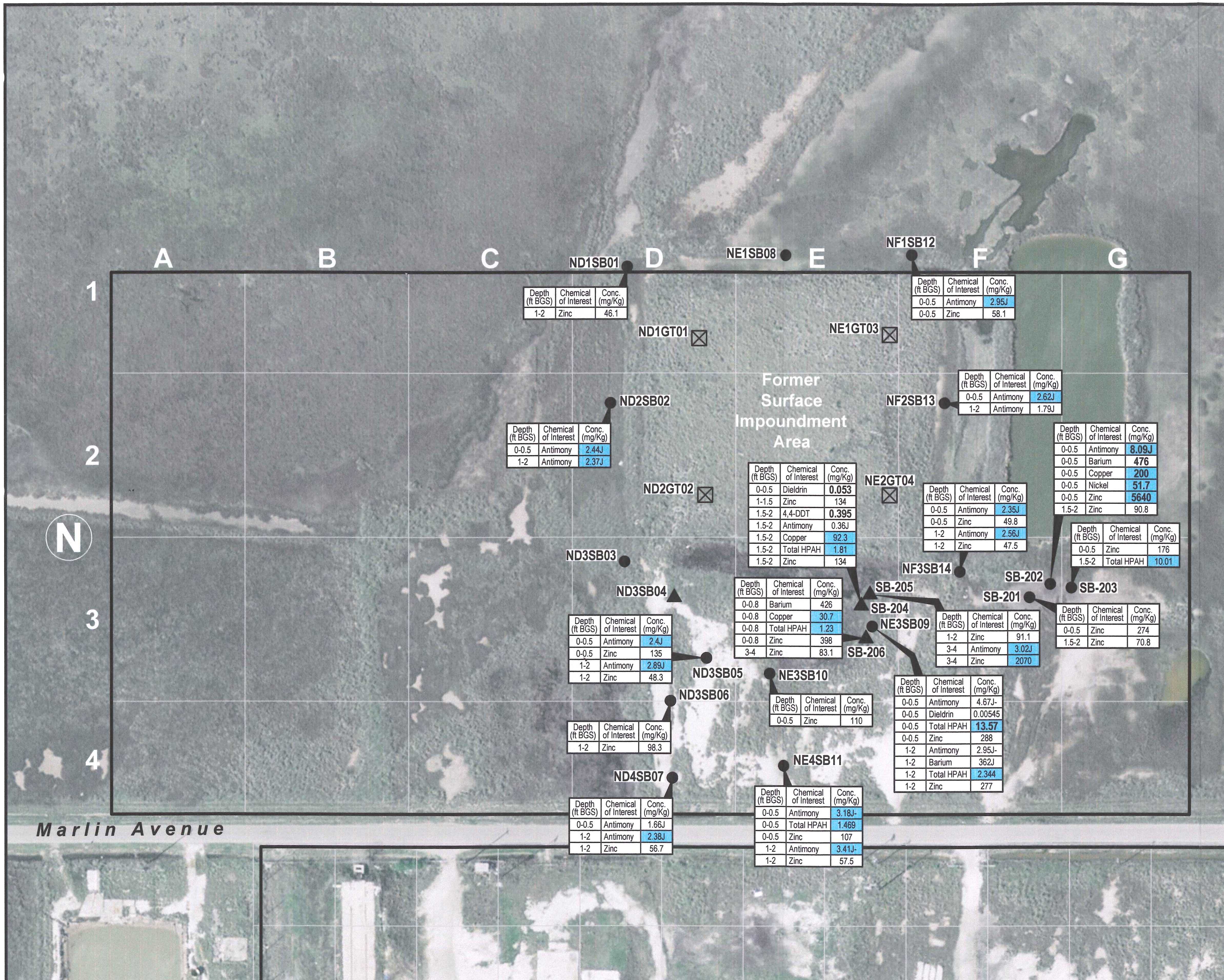


Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-2	Zinc	46.1

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	2.95J
0-0.5	Zinc	58.1

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	2.62J
1-2	Antimony	1.79J

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	2.44J
1-2	Antimony	2.37J

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	**8.09J**
0-0.5	Barium	**476**
0-0.5	Copper	**200**
0-0.5	Nickel	**51.7**
0-0.5	Zinc	**5640**
1.5-2	Zinc	90.8

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Dieldrin	**0.053**
1-1.5	Zinc	134
1.5-2	4,4-DDT	**0.395**
1.5-2	Antimony	0.36J
1.5-2	Copper	92.3
1.5-2	Total HPAH	1.81
1.5-2	Zinc	134

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	2.35J
0-0.5	Zinc	49.8
1-2	Antimony	2.56J
1-2	Zinc	47.5

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Zinc	176
1.5-2	Total HPAH	10.01

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.8	Barium	426
0-0.8	Copper	30.7
0-0.8	Total HPAH	1.23
0-0.8	Zinc	398
3-4	Zinc	83.1

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Zinc	274
1.5-2	Zinc	70.8

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-2	Zinc	91.1
3-4	Antimony	3.02J
3-4	Zinc	2070

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	2.4J
0-0.5	Zinc	135
1-2	Antimony	2.89J
1-2	Zinc	48.3

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Zinc	110

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	4.67J-
0-0.5	Dieldrin	0.00545
0-0.5	Total HPAH	**13.57**
0-0.5	Zinc	288
1-2	Antimony	2.95J-
1-2	Barium	362J
1-2	Total HPAH	2.344
1-2	Zinc	277

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-2	Zinc	98.3

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	1.66J
1-2	Antimony	2.38J
1-2	Zinc	56.7

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	3.18J-
0-0.5	Total HPAH	1.469
0-0.5	Zinc	107
1-2	Antimony	3.41J-
1-2	Zinc	57.5

EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

● Shallow (0-2 ft) Soil Sample

▲ Shallow (0-2 ft) and Deep (4+ ft) Soil Sample

⊠ Geotechnical Soil Boring

Notes:
1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
2. BGS = below ground surface.
3. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for background soil data).
4. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Tables 3 & 4).
The screening levels are:
Antimony - 0.27 mg/Kg
Barium - 330 mg/Kg
Copper - 28 mg/Kg
Dieldrin - 0.0049 mg/Kg
Nickel - 30 mg/Kg
Total HPAH - 1.1 mg/Kg
Zinc - 46 mg/Kg

N

Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 7A

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - NORTH AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

ND1SB01

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	5.17J-
0-0.5	Chromium	11.7
0-0.5	Lithium	20
0-0.5	Vanadium	13.6
1-2	Boron	314J
1-2	Chromium	16.5
1-2	Lithium	**32.2**
1-2	Vanadium	18.5

NE1SB08

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	5.07J
0-0.5	Chromium	10.7
0-0.5	Lithium	16.1
0-0.5	Vanadium	7.85
1-2	Boron	4.33
1-2	Chromium	11.1
1-2	Lithium	17.3
1-2	Vanadium	12.2

NF1SB12

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	9.21J-
0-0.5	Chromium	12.9
0-0.5	Lithium	16.2
0-0.5	Vanadium	22.6

ND2SB02

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	4.22J
0-0.5	Chromium	12.7
0-0.5	Lithium	18.3
0-0.5	Vanadium	25.5
1-2	Chromium	11.2
1-2	Lithium	17.3
1-2	Vanadium	24.2

NF2SB13

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	11.2
0-0.5	Lithium	15.7
0-0.5	Vanadium	25.7
1-2	Boron	6.79J-
1-2	Chromium	12
1-2	Lithium	15.8
1-2	Vanadium	16.2

ND3SB03

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	5.25J
0-0.5	Chromium	8.75
0-0.5	Lithium	14.3
0-0.5	Vanadium	9.5
1-2	Boron	5.37J-
1-2	Chromium	10.9
1-2	Lithium	17.2
1-2	Vanadium	8.34

ND3SB04

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	3.15J
0-0.5	Chromium	10.2
0-0.5	Lithium	19.1
0-0.5	Vanadium	10.5
1-2	Boron	3.84J
1-2	Chromium	7.76
1-2	Lithium	13.1
1-2	Vanadium	8.46

SB-204

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-1.5	Boron	14.7J-
1-1.5	Chromium	18.1
1-1.5	Lithium	16.9
1-1.5	Vanadium	34.4
1.5-2	Boron	15.6J-
1.5-2	Chromium	22.8
1.5-2	Lithium	20.2
1.5-2	Vanadium	21.9

NF3SB14

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	9.84J-
0-0.5	Chromium	12.4
0-0.5	Lithium	19
0-0.5	Vanadium	20.2
1-2	Boron	6.04J-
1-2	Chromium	13.2
1-2	Lithium	19.1
1-2	Vanadium	24.8

SB-202

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	**39.2**
0-0.5	Chromium	**128**
0-0.5	Lithium	18.8
0-0.5	Vanadium	**45.8**
1-2	Boron	16.1
1-2	Chromium	17.9
1-2	Lithium	26.8
1-2	Vanadium	26.6

SB-203

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	17.6
0-0.5	Chromium	24
0-0.5	Lithium	26.6
0-0.5	Vanadium	26.8
1.5-2	Boron	13.8
1.5-2	Chromium	14.8
1.5-2	Lithium	21.5
1.5-2	Vanadium	24.2

SB-206

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.8	Boron	10.8J-
0-0.8	Chromium	23.1
0-0.8	Lithium	11.7
0-0.8	Vanadium	17.1

SB-205

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-2	Boron	15.1J-
1-2	Chromium	20.1
1-2	Lithium	28.8
1-2	Vanadium	27

SB-201

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	18
0-0.5	Chromium	19.6
0-0.5	Lithium	23.9
0-0.5	Vanadium	30.1
1.5-2	Boron	15.4
1.5-2	Chromium	16.5
1.5-2	Lithium	21.7
1.5-2	Vanadium	22.1

ND3SB05

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	8.98
0-0.5	Lithium	15.4
0-0.5	Vanadium	19.5
1-2	Chromium	13.1
1-2	Lithium	23.8
1-2	Vanadium	27.1

ND3SB06

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	9J-
0-0.5	Chromium	11.4
0-0.5	Lithium	19.6
0-0.5	Vanadium	16.9
1-2	Boron	6.89J-
1-2	Chromium	10.2
1-2	Lithium	14
1-2	Vanadium	13.3

NE3SB10

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Boron	6.11J-
0-0.5	Chromium	9.59
0-0.5	Lithium	14.4
0-0.5	Vanadium	14.2
1-2	Boron	13.7J-
1-2	Chromium	13.4
1-2	Lithium	19.6
1-2	Vanadium	16.9

NE3SB09

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	30
0-0.5	Lithium	2.59
0-0.5	Vanadium	10.6
1-2	Chromium	15
1-2	Lithium	11.4
1-2	Vanadium	19.5

ND4SB07

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	7.9
0-0.5	Lithium	13.4
0-0.5	Vanadium	17.8
1-2	Chromium	15.9
1-2	Lithium	27.6
1-2	Vanadium	29.8

NE4SB11

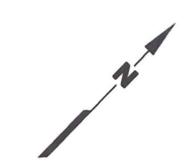
Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	11.5
0-0.5	Lithium	13.2
0-0.5	Vanadium	19.6
1-2	Chromium	15.8
1-2	Lithium	25.7
1-2	Vanadium	32

EXPLANATION

- Gulfco Marine Maintenance Site Boundary (approximate)
- ● Shallow (0-2 ft) Soil Sample
- ▲ Shallow (0-2 ft) and Deep (4+ ft) Soil Sample
- ⊠ Geotechnical Soil Boring

Notes:
1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
2. BGS = below ground surface.
3. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for background soil data).
4. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Tables 3 & 4).
The screening levels are:
Boron - 0.5 mg/Kg
Chromium - 0.4 mg/Kg
Lithium - 2 mg/Kg
Vanadium - 2 mg/Kg



Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

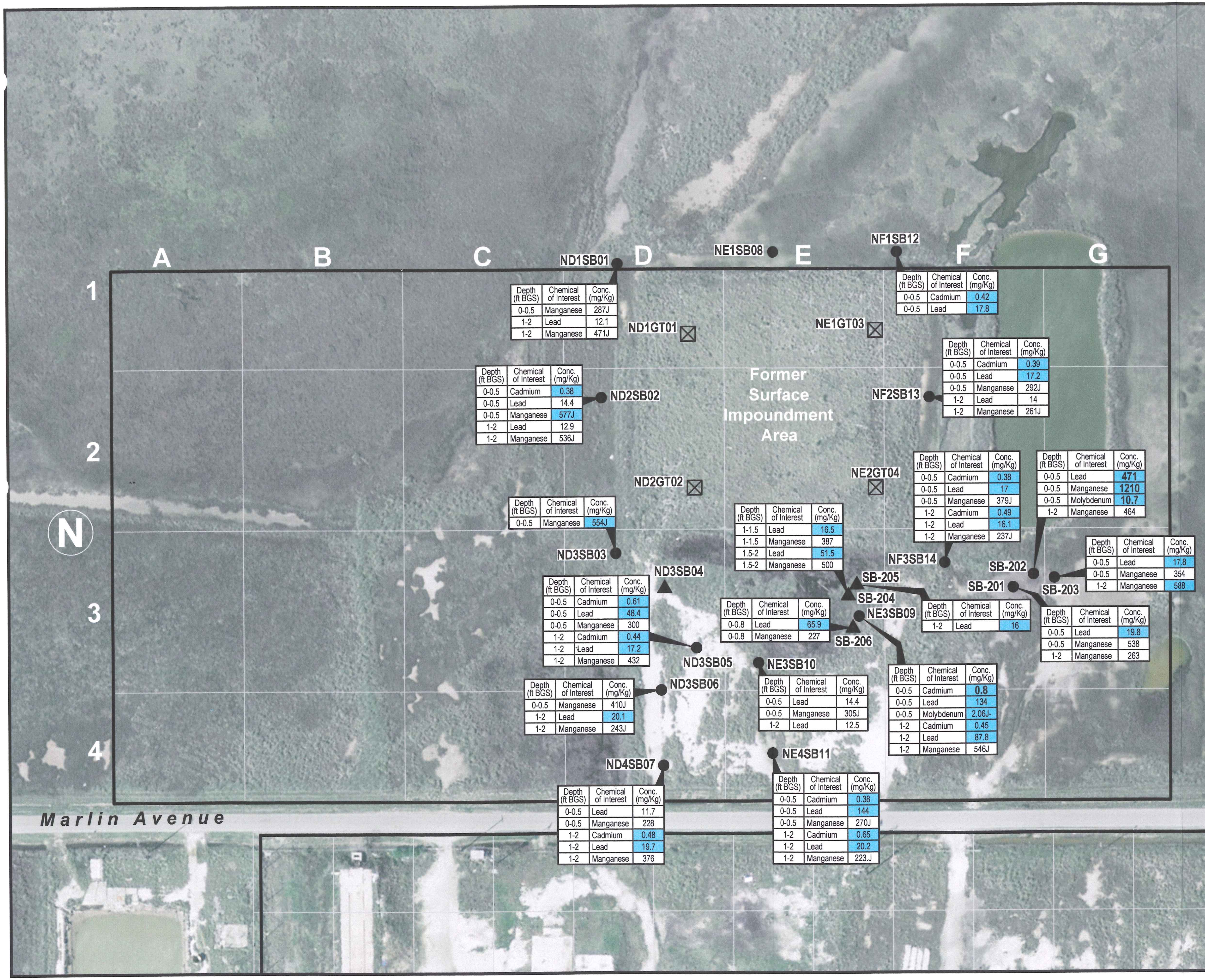
GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 7B

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - NORTH AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



ND1SB01

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Manganese	287J
1-2	Lead	12.1
1-2	Manganese	471J

ND2SB02

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Cadmium	0.38
0-0.5	Lead	14.4
0-0.5	Manganese	577J
1-2	Lead	12.9
1-2	Manganese	536J

ND3SB03

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Manganese	554J

ND3SB05

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Cadmium	0.61
0-0.5	Lead	48.4
0-0.5	Manganese	300
1-2	Cadmium	0.44
1-2	Lead	17.2
1-2	Manganese	432

ND3SB06

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Manganese	410J
1-2	Lead	20.1
1-2	Manganese	243J

ND4SB07

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Lead	11.7
0-0.5	Manganese	228
1-2	Cadmium	0.48
1-2	Lead	19.7
1-2	Manganese	376

NF1SB12

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Cadmium	0.42
0-0.5	Lead	17.8

NF2SB13

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Cadmium	0.39
0-0.5	Lead	17.2
0-0.5	Manganese	292J
1-2	Lead	14
1-2	Manganese	261J

NF3SB14

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Cadmium	0.38
0-0.5	Lead	17
0-0.5	Manganese	379J
1-2	Cadmium	0.49
1-2	Lead	16.1
1-2	Manganese	237J

SB-202

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Lead	**471**
0-0.5	Manganese	**1210**
0-0.5	Molybdenum	**10.7**
1-2	Manganese	464

SB-204

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-1.5	Lead	16.5
1-1.5	Manganese	387
1.5-2	Lead	51.5
1.5-2	Manganese	500

SB-203

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Lead	17.8
0-0.5	Manganese	354
1-2	Manganese	588

SB-205

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-2	Lead	16

SB-206

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.8	Lead	65.9
0-0.8	Manganese	227

SB-201

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Lead	19.8
0-0.5	Manganese	538
1-2	Manganese	263

NE3SB10

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Lead	14.4
0-0.5	Manganese	305J
1-2	Lead	12.5

NE3SB09

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Cadmium	**0.8**
0-0.5	Lead	134
0-0.5	Molybdenum	2.06J-
1-2	Cadmium	0.45
1-2	Lead	87.8
1-2	Manganese	546J

NE4SB11

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Cadmium	0.38
0-0.5	Lead	144
0-0.5	Manganese	270J
1-2	Cadmium	0.65
1-2	Lead	20.2
1-2	Manganese	223.J

EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

● Shallow (0-2 ft) Soil Sample

▲ Shallow (0-2 ft) and Deep (4+ ft) Soil Sample

☒ Geotechnical Soil Boring

Notes:
1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
2. BGS = below ground surface.
3. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for background soil data).
4. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Tables 3 & 4).
The screening levels are:
Cadmium - 0.36 mg/Kg
Lead - 11 mg/Kg
Manganese - 220 mg/Kg
Molybdenum - 2 mg/Kg

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 7C

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - NORTH AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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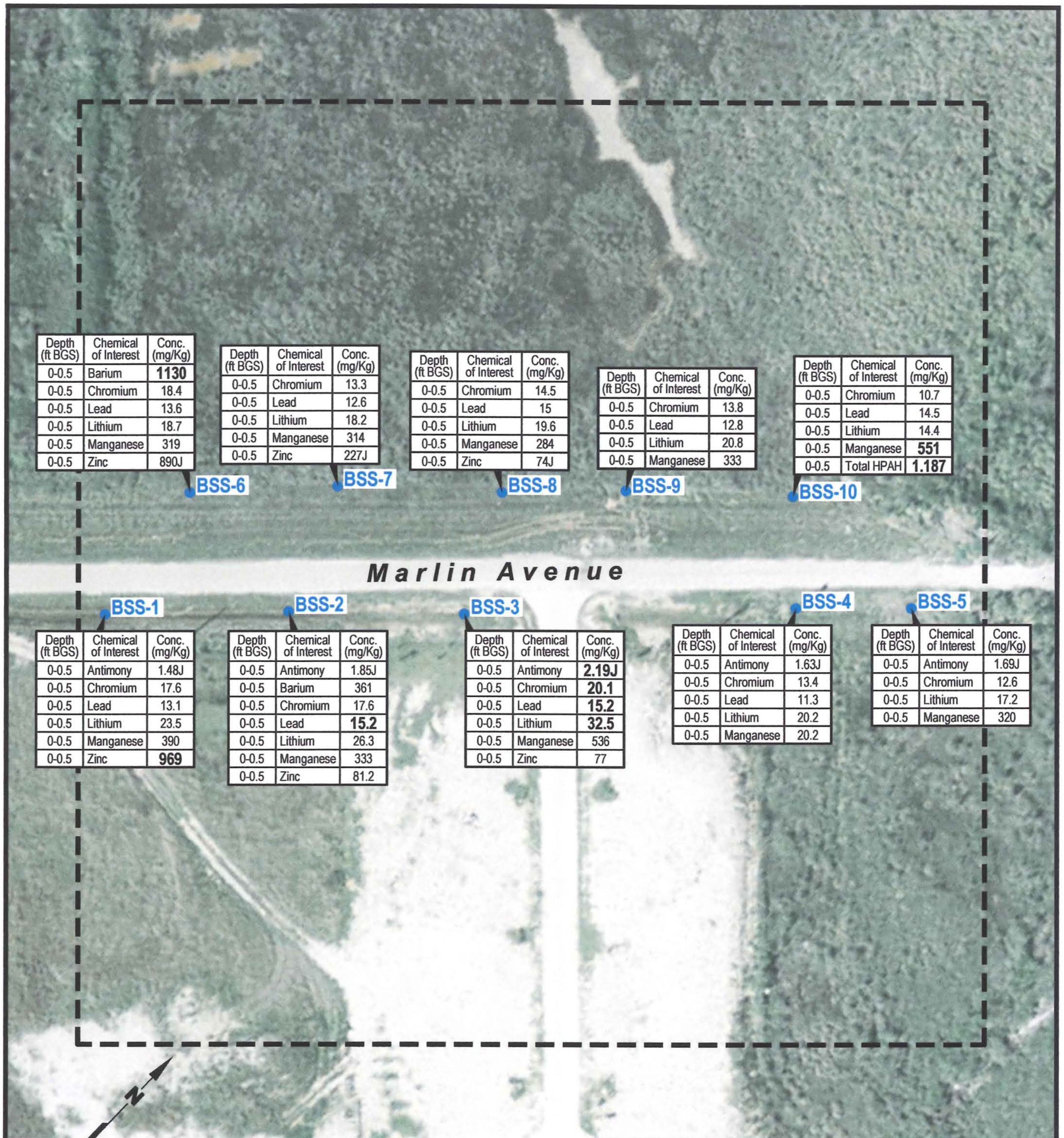

BSS-6

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Barium	**1130**
0-0.5	Chromium	18.4
0-0.5	Lead	13.6
0-0.5	Lithium	18.7
0-0.5	Manganese	319
0-0.5	Zinc	890J

BSS-7

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	13.3
0-0.5	Lead	12.6
0-0.5	Lithium	18.2
0-0.5	Manganese	314
0-0.5	Zinc	227J

BSS-8

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	14.5
0-0.5	Lead	15
0-0.5	Lithium	19.6
0-0.5	Manganese	284
0-0.5	Zinc	74J

BSS-9

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	13.8
0-0.5	Lead	12.8
0-0.5	Lithium	20.8
0-0.5	Manganese	333

BSS-10

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chromium	10.7
0-0.5	Lead	14.5
0-0.5	Lithium	14.4
0-0.5	Manganese	**551**
0-0.5	Total HPAH	**1.187**

BSS-1

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	1.48J
0-0.5	Chromium	17.6
0-0.5	Lead	13.1
0-0.5	Lithium	23.5
0-0.5	Manganese	390
0-0.5	Zinc	**969**

BSS-2

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	1.85J
0-0.5	Barium	361
0-0.5	Chromium	17.6
0-0.5	Lead	**15.2**
0-0.5	Lithium	26.3
0-0.5	Manganese	333
0-0.5	Zinc	81.2

BSS-3

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	**2.19J**
0-0.5	Chromium	**20.1**
0-0.5	Lead	**15.2**
0-0.5	Lithium	**32.5**
0-0.5	Manganese	536
0-0.5	Zinc	77

BSS-4

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	1.63J
0-0.5	Chromium	13.4
0-0.5	Lead	11.3
0-0.5	Lithium	20.2
0-0.5	Manganese	20.2

BSS-5

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Antimony	1.69J
0-0.5	Chromium	12.6
0-0.5	Lithium	17.2
0-0.5	Manganese	320

Approx. Scale in Feet

0 40 80

EXPLANATION

Background Soil Area Boundary (per Figure 8 of Field Sampling Plan)

BSS-1 Approximate Background Soil Sample Location

Source of photo:
H-GAC, Texas aerial photograph, 2006.

Notes:

1. Background Area located approximately 2,000 feet east of Gulfco site.
2. J = Estimated value.
3. BGS = Below ground surface.
4. Bold values are the maximum measured concentration for that compound.

* The compounds shown in the figure are the compounds that were detected at a concentration greater than the screening level (See Table 5).
The screening levels are:
Antimony - 0.27 mg/Kg
Chromium - 0.4 mg/Kg
Lead - 11 mg/Kg
Lithium - 2 mg/Kg
Manganese - 220 mg/Kg
Total HPAH - 1.1 mg/Kg
Zinc - 46 mg/Kg

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 8

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - BACKGROUND AREA SOIL

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

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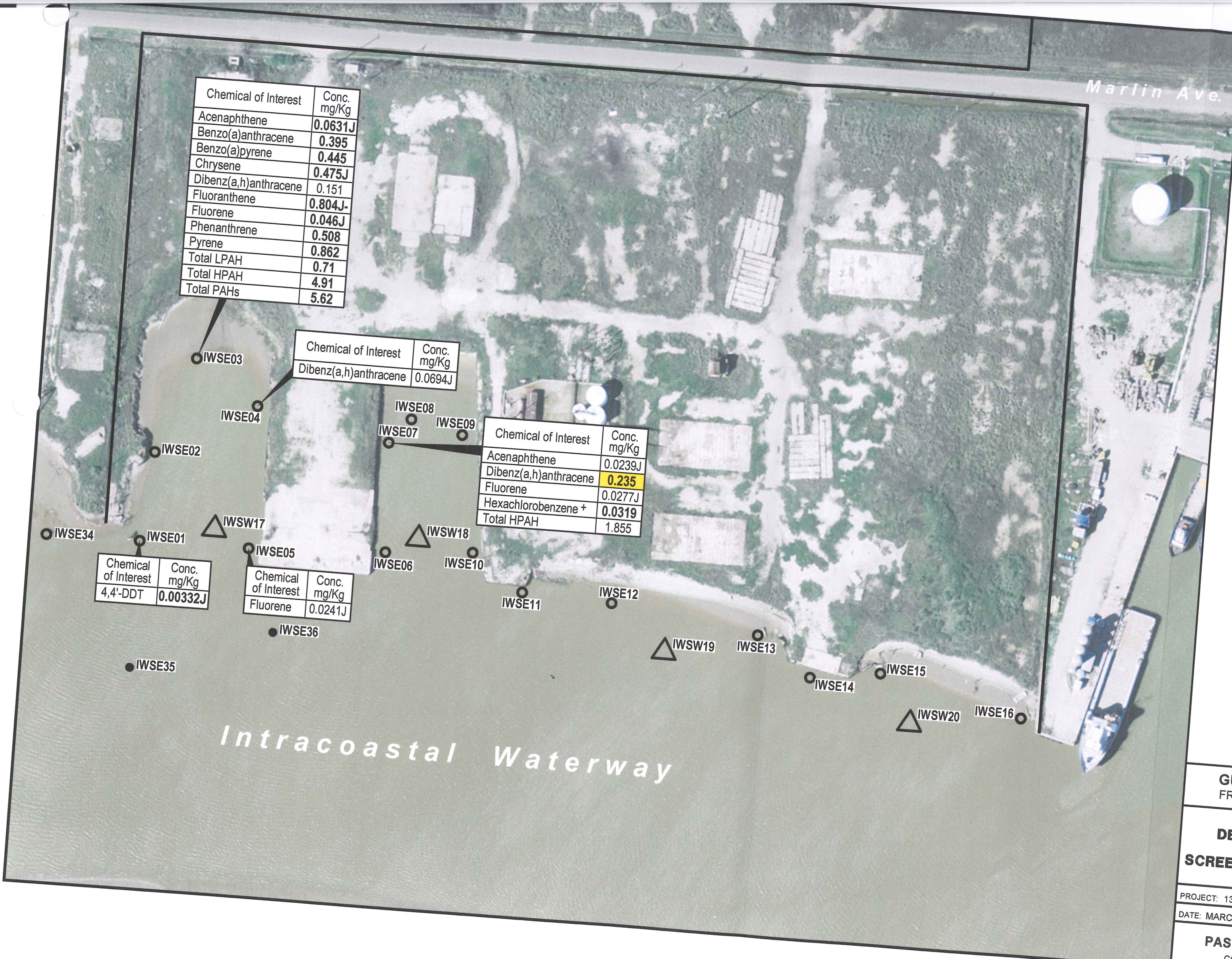

EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

Intracoastal Waterway Sediment Sample

Intracoastal Waterway Surface Water Sample

Attempted Intracoastal Waterway Sediment Sample (not enough sediment present to allow for sampling)

Notes:
1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
2. Total PAH concentrations were calculated using ½ of the sample detection limit as a proxy value for undetected PAHs.
3. Bold values are the maximum measured concentration for that compound.

* Values shown in the figure exceed the Effects Range Low (ERL) (See Table 6). Yellow highlighted values exceed the midpoint of the ERL and Effects Range Medium (ERM).

\+ Value exceeds the Apparent Effects Threshold (AET).

The ERLS are:
4,4'-DDT - 0.0012 mg/Kg
Acenaphthene - 0.016 mg/Kg
Benzo(a)anthracene - 0.261 mg/Kg
Benzo(a)pyrene - 0.430 mg/Kg
Chrysene - 0.384 mg/Kg
Dibenz(a,h)anthracene - 0.0634 mg/Kg
Fluoranthene - 0.6 mg/Kg
Fluorene - 0.019 mg/Kg
Hexachlorobenzene (AET) - 0.006 mg/Kg
Phenanthrene - 0.24 mg/Kg
Pyrene - 0.665 mg/Kg
Total LPAH - 0.552 mg/Kg
Total HPAH - 1.7 mg/Kg
Total PAH - 4.02 mg/Kg

N

Approx. Scale in Feet
0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 9

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS*- INTRACOASTAL WATERWAY SEDIMENT

PROJECT: 1352	BY: ZGK	REVISIONS
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IWSE23

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Arsenic	9.62
0-0.5	Nickel	24.8

IWSE27

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Arsenic	9.58
0-0.5	Nickel	**27.3**

IWSE21

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Arsenic	**9.59**
0-0.5	Nickel	21.8

EXPLANATION

IWSE29 ● Sediment Station

IWSW30 △ Surface Water Station

Notes:
1. Fish tissue samples collected from throughout background area.
2. BGS = below ground surface.
3. Bold values are the maximum measured concentration for that compound.

* Values shown in the figure exceed the Effects Range Low (ERL) (See Table 7). The ERLs are:
Arsenic - 8.2 mg/Kg
Nickel - 20.9 mg/Kg

N

Approx. Scale in Feet
0 125 250

Source of photo: H-GAC, Texas aerial photograph, 2006.

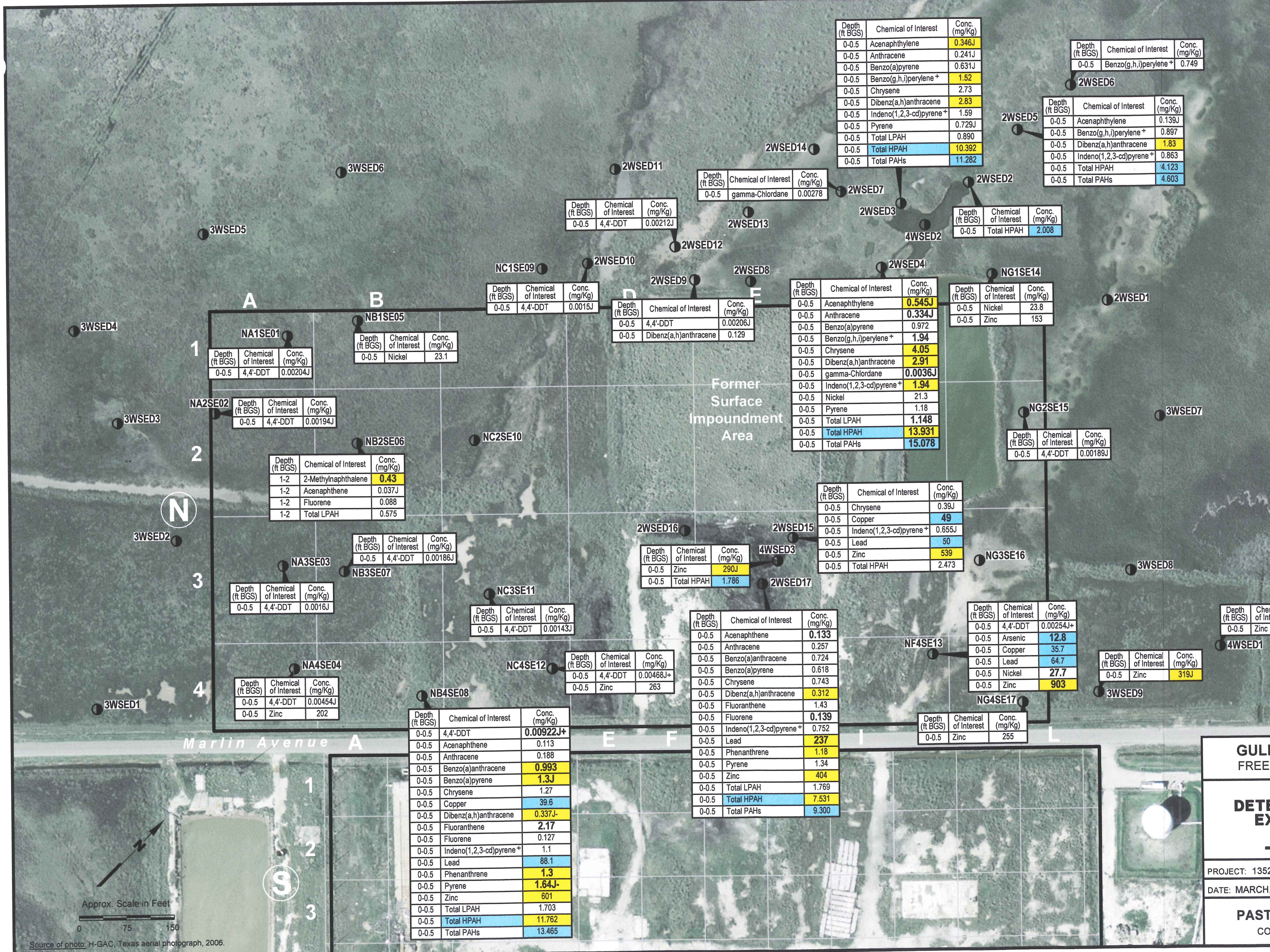
GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 10

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS*- INTRACOASTAL WATERWAY BACKGROUND SEDIMENT

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS



2WSED3

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Acenaphthylene	0.346J
0-0.5	Anthracene	0.241J
0-0.5	Benzo(a)pyrene	0.631J
0-0.5	Benzo(g,h,i)perylene +	1.52
0-0.5	Chrysene	2.73
0-0.5	Dibenz(a,h)anthracene	2.83
0-0.5	Indeno(1,2,3-cd)pyrene +	1.59
0-0.5	Pyrene	0.729J
0-0.5	Total LPAH	0.890
0-0.5	Total HPAH	10.392
0-0.5	Total PAHs	11.282

2WSED6

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Benzo(g,h,i)perylene +	0.749

2WSED5

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Acenaphthylene	0.139J
0-0.5	Benzo(g,h,i)perylene +	0.897
0-0.5	Dibenz(a,h)anthracene	1.83
0-0.5	Indeno(1,2,3-cd)pyrene +	0.863
0-0.5	Total HPAH	4.123
0-0.5	Total PAHs	4.603

2WSED7

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	gamma-Chlordane	0.00278

2WSED12

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00212J

2WSED2

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Total HPAH	2.008

2WSED10

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.0015J

2WSED9

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00206J
0-0.5	Dibenz(a,h)anthracene	0.129

2WSED4

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Acenaphthylene	**0.545J**
0-0.5	Anthracene	**0.334J**
0-0.5	Benzo(a)pyrene	0.972
0-0.5	Benzo(g,h,i)perylene +	**1.94**
0-0.5	Chrysene	**4.05**
0-0.5	Dibenz(a,h)anthracene	**2.91**
0-0.5	gamma-Chlordane	**0.0036J**
0-0.5	Indeno(1,2,3-cd)pyrene +	**1.94**
0-0.5	Nickel	21.3
0-0.5	Pyrene	1.18
0-0.5	Total LPAH	**1.148**
0-0.5	Total HPAH	**13.931**
0-0.5	Total PAHs	**15.078**

NG1SE14

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Nickel	23.8
0-0.5	Zinc	153

NA1SE01

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00204J

NB1SE05

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Nickel	23.1

NA2SE02

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00194J

NB2SE06

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
1-2	2-Methylnaphthalene	**0.43**
1-2	Acenaphthene	0.037J
1-2	Fluorene	0.088
1-2	Total LPAH	0.575

NG2SE15

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00189J

2WSED15

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Chrysene	0.39J
0-0.5	Copper	**49**
0-0.5	Indeno(1,2,3-cd)pyrene +	0.655J
0-0.5	Lead	50
0-0.5	Zinc	539
0-0.5	Total HPAH	2.473

NB3SE07

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00186J

4WSED3

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Zinc	290J
0-0.5	Total HPAH	1.786

NA3SE03

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.0016J

NC3SE11

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00143J

2WSED17

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Acenaphthene	**0.133**
0-0.5	Anthracene	0.257
0-0.5	Benzo(a)anthracene	0.724
0-0.5	Benzo(a)pyrene	0.618
0-0.5	Chrysene	0.743
0-0.5	Dibenz(a,h)anthracene	0.312
0-0.5	Fluoranthene	1.43
0-0.5	Fluorene	**0.139**
0-0.5	Indeno(1,2,3-cd)pyrene +	0.752
0-0.5	Lead	**237**
0-0.5	Phenanthrene	1.18
0-0.5	Pyrene	1.34
0-0.5	Zinc	404
0-0.5	Total LPAH	1.769
0-0.5	Total HPAH	7.531
0-0.5	Total PAHs	9.300

NF4SE13

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00254J+
0-0.5	Arsenic	**12.8**
0-0.5	Copper	35.7
0-0.5	Lead	64.7
0-0.5	Nickel	**27.7**
0-0.5	Zinc	**903**

4WSED1

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Zinc	269J

3WSED9

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Zinc	319J

NC4SE12

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00468J+
0-0.5	Zinc	263

NA4SE04

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	0.00454J
0-0.5	Zinc	202

NG4SE17

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	Zinc	255

NB4SE08

Depth (ft BGS)	Chemical of Interest	Conc. (mg/Kg)
0-0.5	4,4'-DDT	**0.00922J+**
0-0.5	Acenaphthene	0.113
0-0.5	Anthracene	0.188
0-0.5	Benzo(a)anthracene	**0.993**
0-0.5	Benzo(a)pyrene	**1.3J**
0-0.5	Chrysene	1.27
0-0.5	Copper	39.6
0-0.5	Dibenz(a,h)anthracene	0.337J-
0-0.5	Fluoranthene	**2.17**
0-0.5	Fluorene	0.127
0-0.5	Indeno(1,2,3-cd)pyrene +	1.1
0-0.5	Lead	88.1
0-0.5	Phenanthrene	**1.3**
0-0.5	Pyrene	**1.64J-**
0-0.5	Zinc	601
0-0.5	Total LPAH	1.703
0-0.5	Total HPAH	11.762
0-0.5	Total PAHs	13.465

EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

Sediment Sample Location

Notes:

1. Data Qualifiers: J = Estimated value.
   J- = Estimated value, biased low.
   J+ = Estimated value, biased high.
2. BGS = below ground surface.
3. Total PAH concentrations were calculated using ½ of the sample detection limit as a proxy value for undetected PAHs.
4. Bold values are the maximum measured concentration for that compound.
5. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for background soil data).

* Values shown in the figure exceed the Effects Range Low (ERL) (See Table 8). Yellow highlighted values exceed the midpoint of the ERL and Effects Range Medium (ERM).

\+ Value exceeds the Apparent Effects Threshold (AET).

The ERLS are:
2-Methylnaphthalene - 0.07 mg/Kg
4,4'-DDT - 0.0012 mg/Kg
Acenaphthene - 0.016 mg/Kg
Acenaphthylene - 0.044 mg/Kg
Anthracene - 0.0853 mg/Kg
Arsenic - 8.2 mg/Kg
Benzo(a)anthracene - 0.261 mg/Kg
Benzo(a)pyrene - 0.430 mg/Kg
Benzo(g,h,i)perylene (AET) - 0.67 mg/Kg
Chrysene - 0.384 mg/Kg
Copper - 34 mg/Kg
Dibenz(a,h)anthracene - 0.0634 mg/Kg
Fluoranthene - 0.6 mg/Kg
Fluorene - 0.019 mg/Kg
gamma-Chlordane - 0.00226 mg/Kg
Indeno(1,2,3-cd)pyrene (AET) - 0.6 mg/Kg
Lead - 46.7 mg/Kg
Nickel - 20.0 mg/Kg
Phenanthrene - 0.24 mg/Kg
Pyrene - 0.665 mg/Kg
Zinc - 150 mg/Kg
Total LPAH - 0.552 mg/Kg
Total HPAH - 1.7 mg/Kg
Total PAH - 4.02 mg/Kg

GULFCO MARINE MAINTENANCE

FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 11

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - WETLAND SEDIMENT

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

Pond Sediment Sample Location

Notes:
1. All samples from 0-0.5 ft depth interval.
2. Data Qualifiers: J = Estimated value.
3. Bolded values are the maximum measured concentration for that compound.
4. Light blue highlighted values are higher than maximum background concentrations (See Figure 8 for soil background data).

* Values shown in the figure exceed the Effects Range Low (ERL) (See Table 9). Yellow highlighted values exceed the midpoint of the ERL and Effects Range Medium (ERM).
The ERLS are:
4,4'-DDT - 0.0012 mg/kg
Zinc - 150 mg/kg

N

Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 12

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - PONDS SEDIMENT

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

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GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 13

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS*- INTRACOASTAL WATERWAY BACKGROUND SURFACE WATER

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

Wetland Surface Water Sample Location

Notes:
1. Data Qualifier: J = Estimated value.
2. Light blue highlighted values exceed concentrations measured in background surface water (See Figure 13 for background surface water concentrations).
3. Bolded values are the maximum measured concentration for that compound.
* Values shown in the figure exceed the TCEQ Ecological Benchmark for Water (See Tables 12 & 16).

N

Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 14

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - WETLAND SURFACE WATER

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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EXPLANATION

Gulfco Marine Maintenance Site Boundary (approximate)

△ Pond Surface Water Sample Location

Notes:
1. Data Qualifier: J = Estimated value.
2. Bolded values are the maximum measured concentration for that compound.
3. No compounds were measured above background concentrations (See Figure 13 for background surface water concentrations).

* Values shown in the figure exceed the TCEQ Ecological Benchmark for Water (See Tables 13 & 17).

N

Approx. Scale in Feet

0 60 120

Source of photo: H-GAC, Texas aerial photograph, 2006.

GULFCO MARINE MAINTENANCE
FREEPORT, BRAZORIA COUNTY, TEXAS

Figure 15

DETECTED CONCENTRATIONS EXCEEDING ECOLOGICAL SCREENING LEVELS* - PONDS SURFACE WATER

PROJECT: 1352	BY: ZGK	REVISIONS
DATE: MARCH, 2010	CHECKED: KHT	

PASTOR, BEHLING & WHEELER, LLC
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TABLE 1
EXPOSURE POINT CONCENTRATION (mg/kg)
SOUTH AREA SURFACE SOIL*

Chemicals of Interest[+]	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark (1)	EPA Ecological Screening Level (2)		Exposure Point Concentration	Statistic Used (3)	# of Detects/# of Samples
2-Methylnaphthalene	2.97E-02	5.01E-01	1.06E-02	---	---		7.90E-02	97.5% KM (Chebyshev)	22 of 83
4,4'-DDD	3.07E-03	2.43E-02	2.64E-03	---	---	<	2.70E-04	median	5 of 83
4,4'-DDE	1.92E-03	6.93E-02	4.28E-04	---	---		7.52E-03	97.5% KM (Chebyshev)	17 of 83
4,4'-DDT	3.89E-03	6.25E-02	2.81E-04	---	0.021 (m)		1.03E-02	97.5% KM (Chebyshev)	37 of 83
Acenaphthene	6.08E-02	1.69E+00	1.13E-02	20 (p)	---		2.00E-01	97.5% KM (Chebyshev)	26 of 83
Acenaphthylene	4.55E-02	9.35E-01	1.84E-02	---	---		1.21E-01	97.5% KM (Chebyshev)	19 of 83
Aluminum	5.34E+03	1.52E+04	4.14E+02	---	---		5.95E+03	95% Student's-t	83 of 83
Anthracene	9.71E-02	2.46E+00	1.12E-02	---	---		2.99E-01	97.5% KM (Chebyshev)	37 of 83
Antimony	1.65E+00	5.14E+00	2.00E-01	5 (p)	0.27 (m)		2.24E+00	97.5% KM (Chebyshev)	72 of 83
Aroclor-1254	1.46E-01	7.98E+00	3.34E-03	---	---		7.64E-01	97.5% KM (Chebyshev)	13 of 85
Arsenic	3.74E+00	2.43E+01	2.60E-01	18 (p)	18 (p)		6.49E+00	97.5% KM (Chebyshev)	71 of 83
Barium	3.45E+02	2.18E+03	1.86E+01	330 (i)	330 (i)		5.84E+02	97.5% KM (Chebyshev)	83 of 83
Benzo(a)anthracene	3.57E-01	5.02E+00	2.86E-02	---	---		9.03E-01	97.5% KM (Chebyshev)	30 of 83
Benzo(a)pyrene	4.53E-01	4.57E+00	1.03E-02	---	---		1.09E+00	97.5% KM (Chebyshev)	65 of 83
Benzo(b)fluoranthene	5.88E-01	5.42E+00	4.08E-02	---	---		1.10E+00	95% KM (Chebyshev)	61 of 83
Benzo(g,h,i)perylene	3.04E-01	4.24E+00	9.89E-03	---	---		7.89E-01	97.5% KM (Chebyshev)	51 of 83
Benzo(k)fluoranthene	2.44E-01	4.25E+00	1.95E-02	---	---		6.58E-01	97.5% KM (Chebyshev)	33 of 83
Beryllium	4.08E-01	4.60E+00	1.40E-02	10 (p)	21 (m)		7.68E-01	97.5% KM (Chebyshev)	82 of 83
Boron	5.56E+00	5.44E+01	2.43E+00	0.5 (p)	---		7.07E+00	97.5% KM (Bootstrap)	34 of 83
Butyl Benzyl Phthalate	1.90E-02	2.97E-01	1.29E-02	---	---	<	1.25E-02	median	6 of 83
Cadmium	4.69E-01	9.71E+00	2.30E-02	32 (p)	0.36 (m)		1.25E+00	97.5% KM (Chebyshev)	50 of 83
Carbazole	6.20E-02	1.54E+00	1.04E-02	---	---		1.95E-01	97.5% KM (Chebyshev)	29 of 83
Chromium	1.61E+01	1.36E+02	3.37E+00	0.4 (i)	26 (a)		2.68E+01	97.5% Chebyshev	83 of 83
Chrysene	4.09E-01	4.87E+00	9.32E-03	---	---		9.84E-01	97.5% KM (Chebyshev)	56 of 83
Cobalt	3.71E+00	1.60E+01	4.90E-02	13 (p)	13 (p)		5.25E+00	97.5% KM (Chebyshev)	82 of 83
Copper	2.80E+01	2.16E+02	1.55E+00	61 (i)	28 (a)		5.22E+01	97.5% KM (Chebyshev)	83 of 83
Dibenz(a,h)anthracene	1.87E-01	1.64E+00	6.39E-02	---	---		2.45E-01	95% KM (Bootstrap)	36 of 83
Dibenzofuran	3.41E-02	8.21E-01	1.67E-02	---	---		7.23E-02	95% KM (BCA)	17 of 83
Dieldrin	1.40E-03	2.05E-02	2.43E-04	---	0.0049 (m)		3.14E-03	97.5% KM (Chebyshev)	21 of 83
Di-n-butyl Phthalate	9.38E-02	7.53E-01	3.68E-02	200 (p)	---		1.25E-01	97.5% KM (Chebyshev)	9 of 83
Endosulfan Sulfate	2.09E-03	7.13E-02	4.56E-04	---	---		4.21E-03	95% KM (BCA)	17 of 83
Endrin Aldehyde	8.82E-03	7.38E-02	4.97E-04	---	---		8.72E-03	97.5% KM (Chebyshev)	22 of 83
Endrin Ketone	2.25E-03	2.00E-02	4.69E-04	---	---		4.41E-03	97.5% KM (Chebyshev)	18 of 83
Fluoranthene	8.00E-01	1.42E+01	1.33E-02	---	---		2.14E+00	97.5% KM (Chebyshev)	59 of 83
Fluorene	5.18E-02	1.11E+00	9.45E-03	30 (i)	---		1.57E-01	97.5% KM (Chebyshev)	28 of 83
gamma-Chlordane	1.23E-03	1.56E-02	7.10E-04	---	---		2.90E-03	97.5% KM (Chebyshev)	8 of 83
Indeno(1,2,3-cd)pyrene	4.83E-01	6.49E+00	6.34E-02	---	---		9.31E-01	95% KM (Chebyshev)	63 of 83
Iron	1.63E+04	7.71E+04	3.45E+03	---	---		2.40E+04	97.5% Chebyshev	83 of 83
Lead	6.96E+01	6.43E+02	2.82E+00	120 (p)	11 (a)		1.47E+02	97.5% Chebyshev	83 of 83
Lithium	7.86E+00	2.80E+01	6.50E-01	2 (p)	---		1.18E+01	97.5% Chebyshev	83 of 83
Manganese	2.57E+02	8.92E+02	5.93E+01	500 (p)	220 (p)		2.81E+02	95% Student's-t	83 of 83
Mercury	2.22E-02	6.60E-01	3.20E-03	0.1 (i)	---		7.42E-02	97.5% KM (Chebyshev)	37 of 83
Molybdenum	1.32E+00	8.42E+00	9.80E-02	2 (p)	---		2.40E+00	97.5% KM (Chebyshev)	71 of 83
Nickel	1.16E+01	3.67E+01	2.84E+00	30 (p)	38 (p)		1.50E+01	97.5% KM (Chebyshev)	83 of 83
Phenanthrene	5.13E-01	1.26E+01	1.39E-02	---	---		1.06E+04	97.5% KM (Chebyshev)	57 of 83
Pyrene	5.32E-01	8.47E+00	1.21E-02	---	---		1.36E+00	97.5% KM (Chebyshev)	57 of 83
Strontium	7.06E+01	5.27E+02	1.65E+01	---	---		1.01E+02	95% Chebyshev	83 of 83
Tin	8.06E-01	4.95E+00	5.20E-01	50 (p)	---		1.31E+00	97.5% KM (Chebyshev)	23 of 83
Titanium	2.98E+01	6.45E+02	1.15E+01	---	---		6.30E+01	95% Chebyshev	83 of 83
Vanadium	1.38E+01	4.56E+01	5.42E+00	2 (p)	7.8 (a)		1.80E+01	97.5% Chebyshev	83 of 83
Zinc	6.01E+02	4.77E+03	1.23E+01	120 (i)	46 (a)		1.06E+03	97.5% Chebyshev	83 of 83
LPAH	7.98E-01	1.93E+01	7.49E-02	---	29 (i)		1.06E+04		
HPAH	4.36E+00	5.92E+01	2.71E-01	---	1.1 (m)		1.02E+01		
Total PAH	5.15E+00	7.85E+01	3.46E-01	---	---		1.06E+04		

Notes:
* Surface soil was collected from 0 to 0.5 ft. below ground surface.
[+] Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent.
(1) - From Table 3-4 of TCEQ, 2006.
(2) - From www.epa.gov/ecotox/ecossl.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).
(a) - avian
(i) - soil invertebrate
(m) - mammal
(p) - plant

TABLE 2
EXPOSURE POINT CONCENTRATION (mg/kg)
SOUTH AREA SOIL*

Chemicals of Interest[+]	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark [(1)]	EPA Ecological Screening Level [(2)]		Exposure Point Concentration	Statistic Used [(3)]	# of Detects/# of Samples
1,3,5-Trimethylbenzene	9.89E-02	4.36E+00	2.67E-04	---	---		5.56E-01	97.5% KM (Chebyshev)	9 of 83
2-Butanone	3.29E-03	2.26E-02	9.92E-04	---	---		4.14E-03	95% KM (Bootstrap)	4 of 83
2-Hexanone	1.65E-03	2.07E-02	1.09E-03	---	---		3.63E-02	97.5% KM (Chebyshev)	8 of 83
2-Methylnaphthalene	6.97E-02	7.21E+00	1.06E-02	---	---		1.60E-01	95% KM (BCA)	32 of 166
4,4'-DDD	7.76E-03	1.12E+00	3.69E-04	---	---		5.08E-02	97.5% KM (Chebyshev)	21 of 166
4,4'-DDE	1.58E-03	6.93E-02	4.28E-04	---	---		2.81E-03	95% KM (BCA)	22 of 166
4,4'-DDT	3.75E-03	1.13E-01	2.81E-04	---	0.021 (m)		9.27E-03	97.5% KM (Chebyshev)	68 of 166
Acenaphthene	4.33E-02	1.69E+00	1.13E-02	20 (p)	---		1.16E-01	97.5% KM (Chebyshev)	35 of 166
Acenaphthylene	4.84E-02	1.20E+00	1.72E-02	---	---		7.19E-02	95% KM (BCA)	37 of 166
Acetone	3.70E-02	1.60E-01	3.10E-02	---	---		5.41E-02	97.5% KM (Chebyshev)	10 of 83
Aluminum	6.45E+03	1.57E+04	4.14E+02	---	---		8.20E+03	97.5% Chebyshev	166 of 166
Anthracene	8.89E-02	2.46E+00	1.12E-02	---	---		1.24E-01	95% KM (BCA)	65 of 166
Antimony	1.45E+00	5.51E+00	2.00E-01	5 (p)	0.27 (m)		1.87E+00	97.5% KM (Chebyshev)	144 of 166
Aroclor-1254	2.16E-01	1.15E+01	3.34E-03	---	---		7.73E-01	97.5% KM (Chebyshev)	25 of 170
Arsenic	3.33E+00	2.43E+01	2.30E-01	18 (p)	18 (p)		4.92E+00	97.5% KM (Chebyshev)	139 of 166
Barium	2.37E+02	2.18E+03	1.86E+01	330 (i)	330 (i)		3.30E+02	95% Chebyshev	166 of 166
Benzene	3.89E-03	2.21E-02	3.39E-04	---	---		6.09E-03	97.5% KM (Chebyshev)	72 of 83
Benzo(a)anthracene	2.69E-01	5.02E+00	1.18E-02	---	---		6.43E-01	97.5% KM (Chebyshev)	44 of 166
Benzo(a)pyrene	3.48E-01	4.88E+00	9.99E-03	---	---		7.63E-01	97.5% KM (Chebyshev)	113 of 166
Benzo(b)fluoranthene	4.77E-01	5.97E+00	4.08E-02	---	---		8.22E-01	95% KM (Chebyshev)	102 of 166
Benzo(g,h,i)perylene	2.17E-01	4.24E+00	9.89E-03	---	---		4.94E-01	97.5% KM (Chebyshev)	81 of 166
Benzo(k)fluoranthene	1.58E-01	4.25E+00	1.58E-02	---	---		3.81E-01	97.5% KM (Chebyshev)	45 of 166
Beryllium	4.65E-01	4.60E+00	1.40E-02	10 (p)	21 (m)		5.25E-01	95% KM (BCA)	165 of 166
Boron	5.68E+00	5.44E+01	2.43E+00	0.5 (p)	---		6.51E+00	95% KM (Bootstrap)	72 of 166
Butyl Benzyl Phthalate	2.01E-02	6.17E-01	1.29E-02	---	---		4.72E-02	97.5% KM (Chebyshev)	10 of 166
Cadmium	3.40E-01	9.71E+00	2.30E-02	32 (p)	0.36 (m)		4.67E-01	95% KM (Bootstrap)	93 of 166
Carbazole	4.64E-02	1.54E+00	1.04E-02	---	---		1.19E-01	97.5% KM (Chebyshev)	42 of 166
Carbon Disulfide	1.67E-03	2.80E-02	9.87E-04	---	---		3.92E-03	97.5% KM (Chebyshev)	13 of 83
Chromium	1.35E+01	1.36E+02	2.03E+00	0.4 (i)	26 (a)		1.78E+01	95% Chebyshev	166 of 166
Chrysene	3.28E-01	4.87E+00	9.01E-03	---	---		7.12E-01	97.5% KM (Chebyshev)	93 of 166
Cobalt	4.11E+00	1.60E+01	4.90E-02	13 (p)	13 (p)		4.35E+00	95% Winsor-t	165 of 166
Copper	2.43E+01	4.87E+02	1.30E-01	61 (i)	28 (a)		4.01E+01	95% KM (Chebyshev)	164 of 166
Cyclohexane	2.65E-01	2.17E+01	6.26E-04	---	---		1.91E+00	97.5% KM (Chebyshev)	47 of 83
Dibenz(a,h)anthracene	1.48E-01	1.64E+00	6.19E-02	---	---		1.80E-01	95% KM (Bootstrap)	56 of 166
Dibenzofuran	3.34E-02	8.21E-01	1.67E-02	---	---		7.31E-02	97.5% KM (Chebyshev)	23 of 166
Dieldrin	8.89E-04	2.05E-02	2.43E-04	---	0.0049 (m)		2.11E-03	97.5% KM (Chebyshev)	33 of 166
Di-n-butyl Phthalate	4.18E-02	7.53E-01	3.11E-02	200 (p)	---		7.65E-02	97.5% KM (Chebyshev)	11 of 166
Endosulfan Sulfate	1.27E-03	7.13E-02	7.13E-02	---	---		2.30E-03	95% KM (BCA)	21 of 166
Endrin Aldehyde	2.01E-03	7.38E-02	4.97E-04	---	---		3.54E-03	95% KM (BCA)	31 of 166
Endrin Ketone	1.35E-03	2.00E-02	4.69E-04	---	---		2.53E-03	97.5% KM (Chebyshev)	25 of 166
Ethylbenzene	3.40E-03	1.05E-01	6.54E-04	---	---		5.91E-03	95% KM (Bootstrap)	47 of 83
Fluoranthene	5.95E-01	1.42E+01	1.33E-02	---	---		1.41E+00	97.5% KM (Chebyshev)	96 of 166
Fluorene	4.44E-02	1.11E+00	9.45E-03	30 (i)	---		1.07E-01	97.5% KM (Chebyshev)	41 of 166
gamma-Chlordane	9.98E-04	1.56E-02	7.10E-04	---	---		1.84E-03	97.5% KM (Chebyshev)	12 of 166
Indeno(1,2,3-cd)pyrene	3.85E-01	6.49E+00	5.74E-02	---	---		6.58E-01	95% KM (Chebyshev)	104 of 166
Iron	1.43E+04	7.71E+04	2.41E+03	---	---		1.75E+04	95% Chebyshev	166 of 166
Isopropylbenzene (cumene)	8.31E-01	6.49E+01	3.18E-04	---	---		5.85E+00	97.5% KM (Chebyshev)	16 of 83
Lead	5.35E+01	7.02E+02	2.48E+00	120 (p)	11 (a)		1.04E+02	97.5% Chebyshev	166 of 166
Lithium	1.00E+01	2.86E+01	6.50E-01	2 (p)	---		1.22E+01	95% Chebyshev	166 of 166
m,p-Xylene	3.43E-02	2.56E+00	5.58E-04	---	---		1.69E-01	95% KM (Chebyshev)	53 of 83
Manganese	2.61E+02	8.92E+02	5.93E+01	500 (p)	220 (p)		2.78E+02	95% Student's-t	166 of 166
Mercury	2.56E-02	8.50E-01	2.60E-03	0.1 (i)	---		4.00E-02	95%KM (BCA)	73 of 166
Methylcyclohexane	3.66E-02	2.73E+00	2.23E-04	---	---		1.80E-01	95% KM (Chebyshev)	57 of 83
Molybdenum	9.05E-01	1.04E+01	8.80E-02	2 (p)	---		1.62E+00	97.5% KM (Chebyshev)	118 of 166
Naphthalene	3.26E-01	1.92E+01	4.82E-03	---	---	<	2.65E-03	median	8 of 83
Nickel	1.17E+01	3.67E+01	2.70E+00	30 (p)	38 (p)		1.24E+01	95% Student's-t	166 of 166
n-Propylbenzene	2.37E-02	1.80E+00	2.30E-04	---	---		1.63E-01	97.5% KM (Chebyshev)	14 of 83
o-Xylene	1.30E-02	8.40E-01	2.23E-04	---	---		7.75E-02	97.5% KM (Chebyshev)	32 of 83
Phenanthrene	4.02E-01	1.26E+01	1.36E-02	---	---		9.99E-01	97.5% KM (Chebyshev)	95 of 166
Pyrene	4.32E-01	8.47E+00	1.21E-02	---	---		9.71E-01	97.5% KM (Chebyshev)	98 of 166
Strontium	7.56E+01	5.91E+02	1.65E+01	---	---		1.01E+02	95% Chebyshev	166 of 166
Tin	8.11E-01	6.48E+00	5.20E-01	50 (p)	---		1.20E+00	97.5% KM (Chebyshev)	40 of 166
Titanium	2.58E+01	6.45E+02	4.02E+00	---	---		3.22E+01	95% Student's-t	166 of 166
Toluene	3.99E-03	1.92E-02	7.21E-04	---	---		6.04E-03	97.5% KM (Chebyshev)	69 of 83
Vanadium	1.44E+01	4.56E+01	4.73E+00	2 (p)	7.8 (a)		1.73E+01	97.5% Chebyshev	166 of 166
Xylene (total)	4.73E-02	3.40E+00	7.77E-04	---	---		3.04E-01	97.5% KM (Chebyshev)	53 of 83
Zinc	4.34E+02	7.65E+03	6.17E+00	120 (i)	46 (a)		8.15E+02	97.5% Chebyshev	166 of 166
LPAH	1.02E+00	4.55E+01	7.82E-02	---	29 (i)		1.58E+00		
HPAH	3.36E+00	6.00E+01	2.42E-01	---	1.1 (m)		7.03E+00		
Total PAH	4.38E+00	1.06E+02	3.20E-01	---	---		8.61E+00		

Notes:
* Soil was collected from 0 to 4 ft. below ground surface.
[+] Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent.
(1) - From Table 3-4 of TCEQ, 2006.
(2) - From www.epa.gov/ecotox/ecossl.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).
(a) - avian
(i) - soil invertebrate
(m) - mammal
(p) - plant

TABLE 3
EXPOSURE POINT CONCENTRATION (mg/kg)
NORTH AREA SURFACE SOIL*

Chemicals of Interest[+]	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark [(1)]	EPA Ecological Screening Level [(2)]		Exposure Point Concentration	Statistic Used [(3)]	# of Detects/# of Samples
2-Methylnaphthalene	1.46E-02	5.30E-02	1.00E-02	---	---	<	1.18E-02	median	3 of 18
4,4'-DDE	2.87E-03	1.49E-02	2.16E-03	---	---	<	4.24E-04	median	2 of 18
4,4'-DDT	1.50E-03	1.08E-02	5.97E-04	---	0.021 (m)	<	5.45E-04	median	7 of 18
Acenaphthene	2.86E-02	1.57E-01	2.10E-02	20 (p)	---	<	1.10E-02	median	2 of 18
Acenaphthylene	5.55E-02	5.55E-02	5.55E-02	---	---	<	1.21E-02	median	1 of 18
Aluminum	1.07E+04	1.68E+04	1.81E+03	---	---		1.22E+04	95% Student's-t	18 of 18
Anthracene	2.69E-02	2.64E-01	8.87E-03	---	---	<	1.21E-02	median	4 of 18
Antimony	2.52E+00	8.09E+00	1.66E+00	5 (p)	0.27 (m)		4.95E+00	97.5% KM (Chebyshev)	9 of 18
Aroclor-1254	1.22E-02	1.22E-02	1.22E-02	---	---	<	4.29E-03	median	1 of 18
Arsenic	2.53E+00	5.69E+00	5.40E-01	18 (p)	18 (p)		4.22E+00	97.5% KM (Chebyshev)	17 of 18
Barium	1.45E+02	4.76E+02	4.61E+01	330 (i)	330 (i)		2.64E+02	95% Chebyshev	18 of 18
Benzo(a)anthracene	1.18E+00	1.18E+00	1.18E+00	---	---	<	1.10E-02	median	1 of 18
Benzo(a)pyrene	1.19E-01	1.42E+00	1.35E-02	---	---	<	1.16E-02	median	7 of 18
Benzo(b)fluoranthene	1.69E-01	1.62E+00	4.87E-02	---	---		3.73E-01	95% KM (BCA)	8 of 18
Benzo(g,h,i)perylene	1.40E-01	1.28E+00	2.37E-02	---	---		5.92E-01	97.5% KM (Chebyshev)	10 of 18
Benzo(k)fluoranthene	1.13E-01	7.99E-01	1.10E-02	---	---	<	1.75E-02	median	4 of 18
Beryllium	7.11E-01	2.88E+00	6.60E-02	10 (p)	21 (m)		1.60E+00	97.5% KM (Chebyshev)	17 of 18
Bis(2-ethylhexyl)phthalate	4.45E-02	2.39E-01	1.22E-02	---	---	<	5.46E-02	median	6 of 18
Boron	8.74E+00	3.92E+01	3.15E+00	0.5 (p)	---		2.21E+01	97.5% KM (Chebyshev)	13 of 18
Butyl Benzyl Phthalate	1.51E-01	1.51E-01	1.51E-01	---	---	<	1.36E-02	median	1 of 18
Cadmium	3.58E-01	8.00E-01	2.80E-01	32 (p)	0.36 (m)		5.72E-01	97.5% KM (Chebyshev)	8 of 18
Carbazole	2.00E-02	1.28E-01	1.30E-02	---	---	<	1.11E-02	median	4 of 18
Chromium	2.03E+01	1.28E+02	7.90E+00	0.4 (i)	26 (a)		4.86E+01	95% Chebyshev	18 of 18
Chrysene	1.05E-01	1.30E+00	1.10E-02	---	---	<	1.03E-02	median	7 of 18
Cobalt	5.79E+00	7.87E+00	2.81E+00	13 (p)	13 (p)		6.41E+00	95% Student's-t	18 of 18
Copper	2.41E+01	2.00E+02	5.90E+00	61 (i)	28 (a)		7.00E+01	95% Chebyshev	18 of 18
Dibenz(a,h)anthracene	7.69E-02	4.04E-01	4.50E-02	---	---	<	1.10E-02	median	4 of 18
Dibenzofuran	8.62E-02	8.62E-02	8.62E-02	---	---	<	1.52E-02	median	1 of 18
Dieldrin	5.45E-03	5.45E-03	5.45E-03	---	0.0049 (m)	<	1.83E-04	median	1 of 18
Diethyl Phthalate	1.10E-02	1.10E-02	1.10E-02	100 (p)	---	<	1.85E-02	median	1 of 18
Di-n-butyl Phthalate	1.00E-02	1.00E-02	1.00E-02	200 (p)	---	<	3.10E-02	median	1 of 18
Di-n-octyl Phthalate	2.14E-02	1.23E-01	1.54E-02	---	---	<	9.50E-03	median	2 of 18
Endrin	1.49E-03	1.49E-03	1.49E-03	---	---	<	2.22E-04	median	1 of 18
Endrin Ketone	9.66E-03	9.66E-03	9.66E-03	---	---	<	5.48E-04	median	1 of 18
Fluoranthene	1.68E-01	2.19E+00	2.14E-02	---	---	<	1.28E-02	median	6 of 18
Fluorene	2.50E-02	1.41E-01	1.70E-02	30 (i)	---	<	1.09E-02	median	3 of 18
Indeno(1,2,3-cd)pyrene	1.55E-01	1.51E+00	2.00E-02	---	---		6.82E-01	97.5% KM (Chebyshev)	9 of 18
Iron	1.95E+04	1.02E+05	8.45E+03	---	---		4.11E+04	95% Chebyshev	18 of 18
Lead	5.77E+01	4.71E+02	8.22E+00	120 (p)	11 (a)		3.18E+02	99% Chebyshev	18 of 18
Lithium	1.66E+01	2.66E+01	2.59E+00	2 (p)	---		1.87E+01	95% Student's-t	18 of 18
Manganese	3.70E+02	1.21E+03	8.23E+01	500 (p)	220 (p)		7.34E+02	97.5% KM (Chebyshev)	18 of 18
Mercury	1.38E-02	6.40E-02	6.00E-03	0.1 (i)	---		3.75E-02	97.5% KM (Chebyshev)	8 of 18
Molybdenum	9.66E-01	1.07E+01	8.50E-02	2 (p)	---		4.71E+00	97.5% KM (Chebyshev)	11 of 18
Nickel	1.70E+01	5.17E+01	1.17E+01	30 (p)	38 (p)		2.08E+01	95% Student's-t	18 of 18
Phenanthrene	1.15E-01	1.34E+00	1.80E-02	---	---	<	1.42E-02	median	7 of 18
Pyrene	3.86E-01	1.87E+00	1.49E-02	---	---		2.03E+00	97.5% KM (Chebyshev)	8 of 18
Silver	1.10E-01	4.10E-01	9.20E-02	2 (p)	---	<	6.00E-02	median	2 of 18
Strontium	5.73E+01	9.36E+01	2.66E+01	---	---		6.54E+01	95% Student's-t	18 of 18
Thallium	6.30E-01	6.30E-01	6.30E-01	1 (p)	---	<	1.00E-01	median	1 of 18
Tin	7.06E-01	3.67E+00	6.80E-01	50 (p)	---	<	5.90E-01	median	4 of 18
Titanium	2.07E+01	5.59E+01	3.41E+00	---	---		3.78E+01	97.5% KM (Chebyshev)	18 of 18
Vanadium	1.97E+01	4.58E+01	7.85E+00	2 (p)	7.8 (a)		2.34E+01	95% Student's-t	18 of 18
Zinc	4.18E+02	5.64E+03	2.95E+01	120 (i)	46 (a)		3.49E+03	99% Chebyshev	18 of 18
LPAH	2.66E-01	2.01E+00	1.30E-01	---	29 (i)		7.21E-02		
HPAH	2.61E+00	1.36E+01	1.39E+00	---	1.1 (m)		3.75E+00		
Total PAH	2.88E+00	1.56E+01	1.52E+00	---	---		3.83E+00		

Notes:
* Surface soil was collected from 0 to 0.5 ft. below ground surface.
[+] Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent.
(1) - From Table 3-4 of TCEQ, 2006.
(2) - From www.epa.gov/ecotox/ecossl.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).
(a) - avian
(i) - soil invertebrate
(m) - mammal
(p) - plant

TABLE 4
EXPOSURE POINT CONCENTRATION (mg/kg)
NORTH AREA SOIL+

Chemicals of Interest[++]	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark [1]	EPA Ecological Screening Level [2]		Exposure Point Concentration	Statistic Used [3]	# of Detects/# of Samples
1,1-Dichloroethane	2.80E-02	5.18E-01	1.61E-03	---	---	<	1.75E-04	median	3 of 19
1,1-Dichloroethene	1.73E-02	3.13E-01	1.78E-03	---	---	<	3.87E-04	median	2 of 19
1,2-Dichloroethane	2.03E-02	1.78E-01	2.31E-03	---	---	<	1.26E-04	median	4 of 19
2-Butanone	1.32E-02	2.08E-01	1.70E-03	---	---		7.87E-02	97.5% KM (Chebyshev)	11 of 19
2-Methylnaphthalene	4.12E-02	1.04E+00	1.00E-02	---	---	<	1.18E-02	median	4 of 36
4,4'-DDE	2.51E-03	1.49E-02	2.16E-03	---	---	<	4.27E-04	median	2 of 36
4,4'-DDT	1.17E-02	3.95E-01	5.97E-04	---	0.021 (m)		8.18E-02	97.5% KM (Chebyshev)	7 of 36
Acenaphthene	2.72E-02	1.57E-01	2.10E-02	20 (p)	---	<	1.10E-02	median	4 of 36
Aluminum	1.20E+04	1.83E+04	1.81E+03	---	---		1.31E+04	95% Student's-t	36 of 36
Anthracene	2.81E-02	2.64E-01	8.87E-03	---	---	<	1.20E-02	median	6 of 36
Antimony	1.52E+00	8.09E+00	3.60E-01	5 (p)	0.27 (m)		2.63E+00	95% KM (Chebyshev)	16 of 36
Aroclor-1254	1.86E-01	6.35E+00	1.22E-02	---	---	<	4.30E-03	median	2 of 36
Arsenic	2.55E+00	5.69E+00	5.40E-01	18 (p)	18 (p)		3.51E+00	95% KM (Chebyshev)	32 of 36
Barium	1.40E+02	4.76E+02	4.61E+01	330 (i)	330 (i)		2.08E+02	95% Chebyshev	36 of 36
Benzene	2.92E-03	6.32E-03	1.38E-03	---	---		5.39E-03	95% KM (Chebyshev)	12 of 19
Benzo(a)anthracene	1.11E-01	1.18E+00	3.83E-02	---	---	<	1.11E-02	median	4 of 36
Benzo(a)pyrene	9.59E-02	1.42E+00	1.35E-02	---	---		3.87E-01	97.5% KM (Chebyshev)	10 of 36
Benzo(b)fluoranthene	1.46E-01	1.62E+00	4.87E-02	---	---		2.60E-01	95% KM (Bootstrap)	11 of 36
Benzo(g,h,i)perylene	1.05E-01	1.28E+00	2.37E-02	---	---		3.50E-01	97.5% KM (Chebyshev)	14 of 36
Benzo(k)fluoranthene	1.08E-01	7.99E-01	6.80E-02	---	---	<	1.72E-02	median	6 of 36
Beryllium	6.97E-01	2.88E+00	6.60E-02	10 (p)	21 (m)		1.07E+00	95% KM (Chebyshev)	35 of 36
Bis(2-ethylhexyl)phthalate	3.89E-02	2.39E-01	1.22E-02	---	---		9.29E-02	97.5% KM (Chebyshev)	11 of 36
Boron	8.48E+00	3.92E+01	3.14E+00	0.5 (p)	---		1.60E+01	97.5% KM (Chebyshev)	26 of 36
Bromoform	1.14E-02	1.80E-02	1.10E-02	---	---	<	1.86E-04	median	2 of 19
Butyl Benzyl Phthalate	5.66E-02	1.51E-01	5.40E-02	---	---	<	1.36E-02	median	2 of 36
Cadmium	1.93E-01	8.00E-01	2.80E-01	32 (p)	0.36 (m)		4.78E-01	97.5% KM (Chebyshev)	15 of 36
Carbazole	1.76E-02	1.28E-01	1.08E-02	---	---	<	1.10E-02	median	7 of 36
Carbon Disulfide	8.64E-03	2.84E-02	7.57E-03	---	---	<	1.18E-04	median	3 of 19
Chromium	1.73E+01	1.28E+02	7.76E+00	0.4 (i)	26 (a)		2.27E+01	95% Student's-t	36 of 36
Chrysene	1.05E-01	1.30E+00	1.04E-02	---	---		3.94E-01	97.5% KM (Chebyshev)	11 of 36
cis-1,2-Dichloroethene	6.85E-02	9.99E-01	1.95E-02	---	---	<	1.36E-04	median	2 of 19
Cobalt	6.32E+00	1.03E+01	2.81E+00	13 (p)	13 (p)		6.79E+00	95% Student's-t	36 of 36
Copper	2.07E+01	2.00E+02	4.59E+00	61 (i)	28 (a)		4.48E+01	95% Chebyshev	36 of 36
Cyclohexane	1.13E-03	1.85E-03	9.81E-04	---	---	<	1.24E-03	median	5 of 19
Dibenz(a,h)anthracene	6.94E-02	4.04E-01	4.50E-02	---	---	<	1.09E-02	median	7 of 36
Dibenzofuran	2.44E-02	2.91E-01	1.50E-02	---	---	<	1.50E-02	median	2 of 36
Diethyl Phthalate	1.01E-02	1.10E-02	9.92E-03	100 (p)	---	<	1.84E-02	median	2 of 36
Di-n-butyl Phthalate	1.06E-02	1.50E-02	1.00E-02	200 (p)	---	<	3.09E-02	median	2 of 36
Di-n-octyl Phthalate	1.91E-02	1.23E-01	1.54E-02	---	---	<	9.51E-03	median	3 of 36
Ethylbenzene	2.69E-03	2.30E-02	1.14E-03	---	---	<	6.84E-04	median	5 of 19
Fluoranthene	1.53E-01	2.19E+00	2.14E-02	---	---		6.46E-01	97.5% KM (Chebyshev)	9 of 36
Fluorene	5.34E-02	1.21E+00	1.70E-02	30 (i)	---	<	1.08E-02	median	4 of 36
Indeno(1,2,3-cd)pyrene	1.17E-01	1.51E+00	2.00E-02	---	---		4.06E-01	97.5% KM (Chebyshev)	13 of 36
Iron	1.80E+04	1.02E+05	7.12E+03	---	---		2.18E+04	95% Student's-t	36 of 36
Lead	3.82E+01	4.71E+02	5.88E+00	120 (p)	11 (a)		9.54E+01	95% Chebyshev	36 of 36
Lithium	1.89E+01	3.22E+01	2.59E+00	2 (p)	---		2.05E+01	95% Student's-t	36 of 36
m,p-Xylene	1.32E-03	1.39E-03	1.32E-03	---	---	<	4.16E-04	median	2 of 19
Manganese	3.51E+02	1.21E+03	8.23E+01	500 (p)	220 (p)		5.59E+02	97.5% Chebyshev	36 of 36
Mercury	1.03E-02	6.40E-02	3.40E-03	0.1 (i)	---		2.46E-02	97.5% KM (Chebyshev)	13 of 36
Methylcyclohexane	1.76E-03	2.78E-03	1.50E-03	---	---	<	1.52E-03	median	6 of 19
Molybdenum	5.98E-01	1.07E+01	8.50E-02	2 (p)	---		2.42E+00	97.5% KM (Chebyshev)	21 of 36
Naphthalene	1.02E-02	1.48E-01	1.30E-03	---	---	<	3.63E-03	median	6 of 19
Nickel	1.73E+01	5.17E+01	9.74E+00	30 (p)	38 (p)		1.91E+01	95% Student's-t	36 of 36
Phenanthrene	1.54E-01	1.83E+00	1.80E-02	---	---		5.84E-01	97.5% KM (Chebyshev)	11 of 36
Pyrene	2.69E-01	4.64E+00	1.49E-02	---	---		1.15E+00	97.5% KM (Chebyshev)	11 of 36
Silver	1.06E-01	4.10E-01	9.20E-02	2 (p)	---	<	5.90E-02	median	3 of 36
Strontium	5.55E+01	9.62E+01	2.21E+01	---	---		6.13E+01	95% Student's-t	36 of 36
Tetrachloroethene	1.26E-02	2.23E-01	1.35E-03	---	---	<	2.11E-04	median	3 of 19
Tin	8.01E-01	3.67E+00	6.80E-01	50 (p)	---	<	5.70E-01	median	5 of 36
Titanium	2.17E+01	5.70E+01	3.41E+00	---	---		3.57E+01	97.5% KM (Chebyshev)	36 of 36
Toluene	3.24E-03	1.22E-02	1.34E-03	200 (p)	---		8.15E-03	97.5% KM (Chebyshev)	8 of 19
Vanadium	2.06E+01	4.58E+01	7.85E+00	2 (p)	7.8 (a)		2.29E+01	95% Student's-t	36 of 36
Xylene (total)	1.85E-01	1.76E+00	1.39E-03	---	---		8.97E-01	97.5% KM (Chebyshev)	8 of 19
Zinc	2.40E+02	5.64E+03	2.11E+01	120 (i)	46 (a)		1.18E+03	97.5% KM (Chebyshev)	36 of 36
LPAH	3.14E-01	4.65E+00	7.62E-02	---	29 (i)		6.33E-01		
HPAH	1.28E+00	1.63E+01	3.04E-01	---	1.1 (m)		3.63E+00		
Total PAH	1.59E+00	2.10E+01	3.80E-01	---	---		4.26E+00		

Notes:
+ Soil was collected from 0 to 4 ft. below ground surface.
++ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent.
(1) - From Table 3-4 of TCEQ, 2006.
(2) - From www.epa.gov/ecotox/ecossl.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).
(a) - avian
(i) - soil invertebrate
(m) - mammal
(p) - plant

TABLE 5
EXPOSURE POINT CONCENTRATION (mg/kg)
BACKGROUND SOIL+

Chemicals of Interest[++]	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark (1)	EPA Ecological Screening Level (2)		Exposure Point Concentration	Statistic Used (3)	# of Detects/# of Samples
Antimony	1.62E+00	2.19E+00	2.50E-01	5 (p)	0.27 (m)	<	8.90E-01	median	5 of 10
Arsenic	3.44E+00	5.90E+00	2.40E-01	18 (p)	18 (p)		4.48E+00	95% Winsor's-t	10 of 10
Barium	3.33E+02	1.13E+03	1.50E+02	330 (i)	330 (i)		9.02E+02	97.5% Chebyshev	10 of 10
Benzo(a)anthracene	8.20E-02	8.20E-02	8.20E-02	---	---	<	7.61E-03	median	1 of 10
Benzo(a)pyrene	7.60E-02	7.60E-02	7.60E-02	---	---	<	1.00E-02	median	1 of 10
Benzo(b)fluoranthene	5.70E-02	5.70E-02	5.70E-02	---	---	<	8.22E-03	median	1 of 10
Benzo(g,h,i)perylene	8.30E-02	8.30E-02	8.30E-02	---	---	<	3.50E-02	median	1 of 10
Benzo(k)fluoranthene	1.06E-01	1.06E-01	1.06E-01	---	---	<	1.15E-02	median	1 of 10
Cadmium	8.30E-02	1.10E-01	4.10E-02	32 (p)	0.36 (m)	<	1.90E-02	median	3 of 10
Carbazole	1.10E-02	1.10E-02	1.10E-02	---	---	<	8.86E-03	median	1 of 10
Chromium	1.52E+01	2.01E+01	1.07E+01	0.4 (i)	26 (a)		1.70E+01	95% Student's-t	10 of 10
Chrysene	8.30E-02	8.30E-02	8.30E-02	---	---	<	1.40E-02	median	1 of 10
Copper	1.21E+01	1.93E+01	7.68E+00	61 (i)	28 (a)		1.44E+01	95% Student's-t	10 of 10
Fluoranthene	1.56E-01	1.56E-01	1.56E-01	---	---	<	1.15E-02	median	1 of 10
Indeno(1,2,3-cd)pyrene	4.17E-01	4.17E-01	4.17E-01	---	---	<	2.95E-02	median	1 of 10
Lead	1.34E+01	1.52E+01	1.10E+01	120 (p)	11 (a)		1.43E+01	95% Student's-t	10 of 10
Lithium	2.11E+01	3.25E+01	1.44E+01	2 (p)	---		2.41E+01	95% Student's-t	10 of 10
Manganese	3.77E+02	5.51E+02	2.84E+02	500 (p)	220 (p)		5.07E+02	95% Chebyshev	10 of 10
Mercury	2.13E-02	3.00E-02	1.50E-02	0.1 (i)	---		2.41E-02	95% Student's-t	10 of 10
Molybdenum	5.22E-01	6.80E-01	4.20E-01	2 (p)	---		5.65E-01	95% Student's-t	10 of 10
Phenanthrene	1.37E-01	1.37E-01	1.37E-01	---	---	<	6.72E-03	median	1 of 10
Pyrene	1.27E-01	1.27E-01	1.27E-01	---	---	<	2.00E-02	median	1 of 10
Zinc	2.47E+02	9.69E+02	3.66E+01	120 (i)	46 (a)		7.50E+02	95% Chebyshev	10 of 10
LPAH	1.37E-01	1.37E-01	1.37E-01	---	29 (i)		6.72E-03		
HPAH	1.19E+00	1.19E+00	1.19E+00	---	1.1 (m)		1.47E-01		
Total PAH	1.32E+00	1.32E+00	1.32E+00	---	---		1.54E-01		

Notes:
+ Soil was collected from 0 to 4 ft. below ground surface.
[++] Chemicals of interest are any chemical measured in at least one sample.
(1) - From Table 3-4 of TCEQ, 2006.
(2) - From www.epa.gov/ecotox/ecossl.
(3) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).
(a) - avian
(i) - soil invertebrate
(m) - mammal
(p) - plant

TABLE 6
EXPOSURE POINT CONCENTRATION (mg/kg)
INTRACOASTAL WATERWAY SEDIMENT

Chemicals of Interest+	Average	Max Detection	Min Detection	ERL (1)	Midpoint of ERL/ERM (2)	EPA EcoTox Threshold (3)		Exposure Point Concentration	Statistic Used (4)	# of Detects/# of Samples
1,2-Dichloroethane	3.02E-03	3.02E-03	3.02E-03	4.30E+00	1.51E+01	---	<	3.58E-04	median	1 of 16
1,2-Diphenylhydrazine/azobenzene	3.17E-02	3.17E-02	3.17E-02	---	---	---	<	1.10E-02	median	1 of 16
2-Methylnaphthalene	1.88E-02	1.88E-02	1.88E-02	7.00E-02	3.70E-01	---	<	1.46E-02	median	1 of 16
3,3'-Dichlorobenzidine	1.51E-01	1.51E-01	1.51E-01	---	---	---	<	6.32E-02	median	1 of 16
4,4'-DDT	6.90E-04	3.32E-03	4.81E-04	1.19E-03	3.20E-02	1.60E-03	<	2.03E-04	median	4 of 17
4,6-Dinitro-2-methylphenol	6.27E-02	6.27E-02	6.27E-02	---	---	---	<	2.64E-02	median	1 of 16
Acenaphthene	2.64E-02	6.31E-02	2.39E-02	1.60E-02	2.58E-01	1.10E+00	<	1.35E-02	median	2 of 16
Aluminum	6.85E+03	1.25E+04	3.90E+03	---	---	---		7.88E+03	95% Student's-t	16 of 16
Anthracene	3.00E-02	7.53E-02	2.36E-02	8.53E-02	5.93E-01	---	<	1.78E-02	median	6 of 16
Antimony	2.25E+00	8.14E+00	7.40E-01	---	---	---		4.98E+00	97.5% Chebyshev	16 of 16
Arsenic	4.03E+00	7.62E+00	2.41E+00	8.20E+00	3.91E+01	8.20E+00		4.64E+00	95% Student's-t	16 of 16
Atrazine (Aatrex)	8.14E-02	8.14E-02	8.14E-02	---	---	---	<	2.59E-02	median	1 of 16
Barium	2.15E+02	3.77E+02	1.16E+02	---	---	---		3.08E+02	97.5% Chebyshev	16 of 16
Benzo(a)anthracene	9.54E-02	3.95E-01	6.75E-02	2.61E-01	9.31E-01	---	<	1.38E-02	99% Chebyshev	3 of 16
Benzo(a)pyrene	9.46E-02	4.45E-01	5.25E-02	4.30E-01	1.02E+00	4.30E-01	<	1.58E-02	median	6 of 16
Benzo(b)fluoranthene	1.12E-01	6.11E-01	3.24E-02	---	---	---		3.52E-01	97.5% KM (Chebyshev)	9 of 16
Benzo(g,h,i)perylene	7.19E-02	4.42E-01	1.73E-02	---	---	---	<	1.72E-02	median	7 of 16
Benzo(k)fluoranthene	8.18E-02	3.18E-01	4.74E-02	---	---	---	<	2.43E-01	median	6 of 16
Beryllium	4.63E-01	8.20E-01	2.90E-01	---	---	---		5.28E-01	95% Student's-t	16 of 16
Boron	1.65E+01	2.72E+01	1.25E+01	---	---	---		2.47E+01	97.5% KM (Chebyshev)	10 of 16
Butyl Benzyl Phthalate	2.02E-01	2.02E-01	2.02E-01	---	---	1.10E+01	<	1.65E-02	median	1 of 16
Carbazole	2.53E-02	8.61E-02	1.95E-02	---	---	---	<	1.38E-02	median	3 of 16
Chloroform	5.05E-03	5.27E-03	5.04E-03	4.30E+00	1.51E+01	---	<	4.42E-04	median	2 of 16
Chromium	9.21E+00	1.44E+01	5.01E+00	8.10E+01	2.26E+02	8.10E+01		1.04E+01	95% Student's-t	16 of 16
Chrysene	8.03E-02	4.75E-01	1.37E-02	3.84E-01	1.59E+00	---		2.73E-01	97.5% KM (Chebyshev)	10 of 16
Cobalt	4.39E+00	7.16E+00	3.05E+00	---	---	---		4.88E+00	95% Student's-t	16 of 16
Copper	7.11E+00	1.26E+01	3.28E+00	3.40E+01	1.52E+02	3.40E+01		8.43E+00	95% Student's-t	16 of 16
Cyclohexane	1.92E-03	1.92E-03	1.92E-03	---	---	---	<	3.29E-03	median	1 of 16
Dibenz(a,h)anthracene	7.12E-02	2.35E-01	5.11E-02	6.34E-02	1.62E-01	---	<	1.57E-02	median	6 of 16
Dibenzofuran	2.70E-02	3.05E-02	2.68E-02	---	---	2.00E+00	<	1.92E-02	median	2 of 16
Diethyl Phthalate	3.89E-02	3.89E-02	3.89E-02	---	---	6.30E-01	<	2.24E-02	median	1 of 16
Di-n-octyl Phthalate	2.58E-02	1.92E-01	1.47E-02	---	---	---	<	1.13E-02	median	2 of 16
Fluoranthene	1.20E-01	8.04E-01	2.22E-02	6.00E-01	2.85E+00	1.40E+00		4.39E-01	97.5% KM (Chebyshev)	8 of 16
Fluorene	1.62E-02	4.60E-02	1.24E-02	1.90E-02	2.80E-01	5.40E-01	<	1.38E-02	median	4 of 16
gamma-Chlordane	6.54E-04	8.26E-04	6.38E-04	2.26E-03	3.53E-03	---	<	3.91E-04	median	4 of 16
Hexachlorobenzene	3.19E-02	3.19E-02	3.19E-02	---	---	---	<	1.62E-02	median	1 of 16
Indeno(1,2,3-cd)pyrene	9.99E-02	4.05E-01	5.56E-02	---	---	---	<	2.53E-02	median	6 of 16
Iron	1.34E+04	2.82E+04	6.75E+03	---	---	---		2.20E+04	97.5% Chebyshev	16 of 16
Isopropylbenzene (cumene)	4.79E-03	7.04E-03	4.64E-03	---	---	---	<	4.80E-04	median	2 of 16
Lead	1.16E+01	3.23E+01	5.00E+00	4.67E+01	1.32E+02	4.70E+01		2.27E+01	97.5% Chebyshev	16 of 16
Lithium	1.05E+01	2.00E+01	6.40E+00	---	---	---		1.21E+01	95% Student's-t	16 of 16
Manganese	2.83E+02	4.74E+02	1.92E+02	---	---	---		3.22E+02	95% Student's-t	16 of 16
Mercury	2.01E-02	3.60E-02	1.10E-02	1.50E-01	4.30E-01	1.50E-01		2.33E-02	95% Student's-t	16 of 16
Methylcyclohexane	3.70E-03	3.70E-03	3.70E-03	---	---	---	<	1.70E-03	median	1 of 16
Molybdenum	6.67E-01	5.66E+00	1.40E-01	---	---	---		2.15E+00	95% Chebyshev	16 of 16
Nickel	9.59E+00	1.67E+01	5.80E+00	2.09E+01	3.63E+01	2.10E+01		1.08E+01	95% Student's-t	16 of 16
n-Nitrosodiphenylamine	4.34E-02	4.34E-02	4.34E-02	---	---	---	<	1.50E-02	median	1 of 16
Phenanthrene	8.58E-02	5.08E-01	3.11E-02	2.40E-01	8.70E-01	1.10E+00		2.80E-01	97.5% KM (Chebyshev)	8 of 16
Pyrene	1.33E-01	8.62E-01	1.76E-02	6.65E-01	1.63E+00	6.60E-01		4.82E-01	97.5% KM (Chebyshev)	10 of 16
Silver	3.35E-01	5.40E-01	3.00E-01	---	---	---	<	8.95E-02	median	6 of 16
Strontium	4.49E+01	8.17E+01	3.28E+01	---	---	---		5.12E+01	95% Student's-t	16 of 16
Titanium	2.56E+01	3.66E+01	1.91E+01	---	---	---		2.78E+01	95% Student's-t	16 of 16
Toluene	5.81E-03	5.81E-03	5.81E-03	9.40E-01	3.30E+00	6.70E-01	<	1.73E-03	median	1 of 16
Vanadium	1.39E+01	2.12E+01	9.06E+00	---	---	---		1.54E+01	95% Student's-t	16 of 16
Zinc	4.54E+01	9.26E+01	1.80E+01	1.50E+02	2.80E+02	1.50E+02		5.41E+01	95% Student's-t	16 of 16
LPAH	1.77E-01	7.11E-01	1.10E-01	5.52E-01	1.86E+00	---		3.40E-01		
HPAH	9.60E-01	4.99E+00	3.77E-01	1.70E+00	5.65E+00	---		1.88E+00		
Total PAHs	1.14E+00	5.70E+00	4.87E-01	4.02E+00	2.44E+01	4.00E+00		2.22E+00		

Notes:

+ Chemicals of interest are any chemical measured in at least one sample.

(1) - Effects Range Low.

(2) - Midpoint of the ERL and ERM (Effects Range Medium).

(3) - From Table 2 of EPA's EcoTox Threshold ECO Update January, 1999.

(4) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 7
EXPOSURE POINT CONCENTRATION (mg/kg)
INTRACOASTAL WATERWAY BACKGROUND SEDIMENT

Chemicals of Interest[+]	Average	Max Detection	Min Detection	ERL (1)	Midpoint of ERL/ERM (2)	EPA EcoTox Threshold (3)		Exposure Point Concentration	Statistic Used (4)	# of Detects/# of Samples
1,2,4-Trimethylbenzene	3.91E-03	3.91E-03	3.91E-03	2.16E+00	7.56E+00	---	<	7.24E-04	median	1 of 9
1,4-Dichlorobenzene	4.11E-03	4.11E-03	4.11E-03	7.00E-01	2.46E+00	3.50E-01	<	1.54E-03	median	1 of 9
2-Butanone	2.08E-03	2.16E-03	2.00E-03	---	---	---	<	2.00E-03	median	2 of 9
4,4'-DDT	5.70E-04	5.70E-04	5.70E-04	1.19E-03	3.20E-02	1.60E-03	<	2.10E-04	median	1 of 9
Aluminum	1.22E+04	2.18E+04	4.73E+03	---	---	---		1.65E+04	95% Student's-t	9 of 9
Antimony	4.02E+00	7.33E+00	1.68E+00	---	---	---		5.40E+00	95% Student's-t	9 of 9
Arsenic	5.81E+00	9.62E+00	2.36E+00	8.20E+00	3.91E+01	8.20E+00		7.74E+00	95% Student's-t	9 of 9
Barium	209.7.2	2.80E+02	1.11E+02	---	---	---		2.39E+02	95% Student's-t	9 of 9
Benzo(b)fluoranthene	3.69E-02	3.69E-02	3.69E-02	---	---	---	<	1.09E-02	median	1 of 9
Beryllium	7.66E-01	1.32E+00	3.20E-01	---	---	---		1.02E+00	95% Student's-t	9 of 9
Boron	2.76E+01	4.79E+01	1.33E+01	---	---	---		3.56E+01	95% Student's-t	9 of 9
Carbon Disulfide	5.91E-03	8.41E-03	3.41E-03	---	---	---	<	8.40E-04	median	2 of 9
Chromium	1.28E+01	2.25E+01	5.81E+00	8.10E+01	2.26E+02	8.10E+01		1.69E+01	95% Student's-t	9 of 9
cis-1,2-Dichloroethene	2.84E-02	2.84E-02	2.84E-02	---	---	---	<	4.61E-04	median	1 of 9
Cobalt	6.70E+00	1.18E+01	3.32E+00	---	---	---		8.66E+00	95% Student's-t	9 of 9
Copper	8.14E+00	1.68E+01	2.68E+00	3.40E+01	1.52E+02	3.40E+01		1.13E+01	95% Student's-t	9 of 9
Iron	1.65E+04	2.79E+04	7.44E+03	---	---	---		2.15E+04	95% Student's-t	9 of 9
Lead	9.59E+00	1.45E+01	5.34E+00	4.67E+01	1.32E+02	4.70E+01		1.18E+01	95% Student's-t	9 of 9
Lithium	2.14E+01	4.46E+01	7.29E+00	---	---	---		3.03E+01	95% Student's-t	9 of 9
Manganese	3.31E+02	4.42E+02	2.12E+02	---	---	---		3.86E+02	95% Student's-t	9 of 9
Mercury	1.76E-02	5.00E-02	6.50E-03	1.50E-01	4.30E-01	1.50E-01		3.68E-02	95% Chebyshev	9 of 9
Molybdenum	2.41E-01	3.50E-01	1.60E-01	---	---	---		2.83E-01	95% Student's-t	9 of 9
Nickel	1.49E+01	2.73E+01	6.31E+00	2.09E+01	3.63E+01	2.10E+01		1.99E+01	95% Student's-t	9 of 9
Strontium	5.92E+01	8.74E+01	3.48E+01	---	---	---		7.28E+01	95% Student's-t	9 of 9
Titanium	3.18E+01	5.45E+01	2.11E+01	---	---	---		3.83E+01	95% Student's-t	9 of 9
Trichloroethene	1.59E-02	1.59E-02	1.59E-02	1.47E+00	5.15E+00	1.60E+00	<	6.47E-04	median	1 of 9
Vanadium	2.02E+01	3.42E+01	1.02E+01	---	---	---		2.59E+01	95% Student's-t	9 of 9
Xylene	3.35E-03	3.35E-03	3.35E-03	---	---	---	<	2.09E-03	median	1 of 9
Zinc	3.60E+01	5.41E+01	1.93E+01	1.50E+02	2.80E+02	1.50E+02		4.45E+01	95% Student's-t	9 of 9
LPAH[++]				5.52E-01	1.86E+00	---				
HPAH	3.69E-02	3.69E-02	3.69E-02	1.70E+00	5.65E+00	---		1.09E-02		
Total PAHs	3.69E-02	3.69E-02	3.69E-02	4.02E+00	2.44E+01	---		1.09E-02		

Notes:
[+] Chemicals of interest are any chemical measured in at least one sample.
[++] No LPAHs were detected in the samples.
(1) - Effects Range Low.
(2) - Midpoint of the ERL and ERM (Effects Range Medium).
(3) - From Table 2 of EPA's EcoTox Threshold ECO Update January, 1999.
(4) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 8
EXPOSURE POINT CONCENTRATION (mg/kg)
WETLAND SEDIMENT

Chemicals of Interest+	Average	Max Detection	Min Detection	ERL (1)	Midpoint of ERL/ERM (2)	EPA EcoTox Threshold (3)		Exposure Point Concentration	Statistic Used (4)	# of Detects/# of Samples
1,2-Dichloroethane	1.85E-03	2.40E-03	1.83E-03	4.30E+00	1.51E+01	---	<	1.50E-04	median	3 of 48
2-Methylnaphthalene	2.25E-02	4.30E-01	1.22E-02	7.00E-02	3.70E-01	---	<	1.20E-02	median	4 of 48
4,4'-DDT	1.39E-03	9.22E-03	9.29E-04	1.19E-03	3.20E-02	1.60E-03		2.52E-03	97.5% KM (Chebyshev)	16 of 55
Acenaphthene	2.13E-02	1.33E-01	1.60E-02	1.60E-02	2.58E-01	1.10E+00	<	1.11E-02	median	4 of 48
Acenaphthylene	4.88E-02	5.45E-01	2.91E-02	4.40E-02	3.42E-01	---	<	1.27E-02	median	4 of 48
Aluminum	1.32E+04	1.82E+04	3.40E+03	---	---	---		1.40E+04	95% Student's-t	48 of 48
Anthracene	2.99E-02	3.34E-01	8.38E-03	8.53E-02	5.93E-01	---		9.70E-02	97.5% KM (Chebyshev)	8 of 48
Antimony(5)	1.24E+00	4.24E+00	4.60E-01	---	---	---		1.80E+00	97.5% KM (Chebyshev)	40 of 48
Arsenic	2.78E+00	1.28E+01	1.00E+00	8.20E+00	3.91E+01	8.20E+00		4.81E+00	97.5% KM (Chebyshev)	35 of 48
Barium	1.52E+02	8.20E+02	3.60E+01	---	---	---		2.38E+02	95% Chebyshev	48 of 48
Benzo(a)anthracene	9.20E-02	9.93E-01	5.46E-02	2.61E-01	9.31E-01	---	<	1.14E-02	median	5 of 48
Benzo(a)pyrene	1.10E-01	1.30E+00	1.76E-02	4.30E-01	1.02E+00	4.30E-01		3.47E-01	97.5% KM (Chebyshev)	15 of 48
Benzo(b)fluoranthene	9.23E-02	1.36E+00	1.62E-02	---	---	---		1.59E-01	95% KM (BCA)	19 of 48
Benzo(g,h,i)perylene	2.06E-01	1.94E+00	4.40E-02	---	---	---		4.49E-01	95% KM (Chebyshev)	24 of 48
Benzo(k)fluoranthene	1.01E-01	7.30E-01	6.92E-02	---	---	---		1.31E-01	95% KM (Bootstrap)	14 of 48
Beryllium	8.94E-01	1.37E+00	2.80E-01	---	---	---		9.43E-01	95% Student's-t	48 of 48
Boron(5)	1.53E+01	4.62E+01	5.17E+00	---	---	---		2.61E+01	97.5% KM (Chebyshev)	24 of 48
Cadmium	1.16E-01	4.80E-01	3.30E-02	1.20E+00	5.40E+00	1.20E+00		2.42E-01	97.5% KM (Chebyshev)	20 of 48
Carbazole	2.12E-02	1.41E-01	1.58E-02	---	---	---	<	1.10E-02	median	5 of 48
Carbon Disulfide	3.48E-03	6.99E-03	3.34E-03	---	---	---	<	1.40E-04	median	4 of 48
Chromium	1.51E+01	4.46E+01	8.96E+00	8.10E+01	2.26E+02	8.10E+01		1.64E+01	95% Student's-t	48 of 48
Chromium VI	1.63E+00	4.04E+00	1.30E+00	---	---	---	<	5.67E-01	median	6 of 25
Chrysene	2.15E-01	4.05E+00	1.10E-02	3.84E-01	1.59E+00	---		8.71E-01	97.5% KM (Chebyshev)	19 of 48
Cobalt	6.98E+00	9.89E+00	3.00E+00	---	---	---		7.32E+00	95% Student's-t	48 of 48
Copper	1.45E+01	4.90E+01	5.44E+00	3.40E+01	1.52E+02	3.40E+01		2.21E+01	97.5% KM (Chebyshev)	48 of 48
Dibenz(a,h)anthracene	2.87E-01	2.91E+00	1.29E-01	6.34E-02	1.62E-01	---	<	3.75E-02	median	6 of 48
Dibenzofuran	1.29E-02	8.00E-02	1.00E-02	---	---	2.00E+00	<	1.56E-02	median	3 of 48
Endosulfan Sulfate	8.46E-03	6.00E-02	7.31E-03	---	---	5.40E-03	<	4.40E-04	median	3 of 48
Endrin Aldehyde	1.28E-03	1.00E-02	5.66E-04	---	---	---		3.32E-03	97.5% KM (Chebyshev)	9 of 48
Endrin Ketone	3.55E-03	1.30E-02	3.29E-03	---	---	---	<	5.50E-04	median	3 of 48
Fluoranthene	1.04E-01	2.17E+00	1.20E-02	6.00E-01	2.85E+00	1.40E+00		4.46E-01	97.5% KM (Chebyshev)	13 of 48
Fluorene	2.17E-02	1.39E-01	1.50E-02	1.90E-02	2.80E-01	5.40E-01	<	1.10E-02	median	4 of 48
gamma-Chlordane	8.77E-04	3.60E-03	7.69E-04	2.26E-03	3.53E-03	---	<	4.40E-04	median	4 of 48
Indeno(1,2,3-cd)pyrene	2.20E-01	1.94E+00	6.28E-02	---	---	---		3.17E-01	95% KM (BCA)	23 of 48
Iron	1.72E+04	6.09E+04	1.11E+04	---	---	---		1.88E+04	95% Student's-t	49 of 48
Lead	2.54E+01	2.37E+02	9.40E+00	4.67E+01	1.32E+02	4.70E+01		4.68E+01	95% Chebyshev	48 of 48
Lithium	1.87E+01	2.76E+01	5.43E+00	---	---	---		1.96E+01	95% Student's-t	48 of 48
Manganese	3.32E+02	1.01E+03	8.76E+01	---	---	---		5.17E+02	97.5% Chebyshev	48 of 48
Mercury	2.04E-02	8.10E-02	6.10E-03	1.50E-01	4.30E-01	1.50E-01		3.80E-02	97.5% KM (Chebyshev)	26 of 48
Molybdenum	5.99E-01	3.24E+00	1.30E-01	---	---	---		1.20E+00	97.5% KM (Chebyshev)	38 of 48
Nickel	1.73E+01	2.77E+01	1.09E+01	2.09E+01	3.63E+01	2.10E+01		1.81E+01	95% Student's-t	48 of 48
Phenanthrene	8.46E-02	1.30E+00	2.30E-02	2.40E-01	8.70E-01	1.10E+00		1.56E-01	95% KM (BCA)	12 of 48
Pyrene	1.52E-01	1.64E+00	1.59E-02	6.65E-01	1.63E+00	6.60E-01		4.77E-01	97.5% KM (Chebyshev)	19 of 48
Strontium	6.70E+01	3.30E+02	1.88E+01	---	---	---		1.15E+02	97.5% KM (Chebyshev)	48 of 48
Tin(5)	6.38E-01	4.61E+00	3.45E+00	---	---	---		1.26E+00	95% Chebyshev	4 of 48
Titanium	2.91E+01	6.87E+01	8.15E+00	---	---	---		4.17E+01	97.5% Chebyshev	48 of 48
Toluene	1.58E-03	2.14E-03	1.57E-03	9.40E-01	3.30E+00	6.70E-01	<	7.30E-04	median	3 of 48
Vanadium	2.17E+01	3.20E+01	9.02E+00	---	---	---		2.28E+01	95% Student's-t	48 of 48
Zinc	1.39E+02	9.03E+02	3.15E+01	1.50E+02	2.80E+02	1.50E+02		2.36E+02	95% Chebyshev	53 of 53
LPAH	2.29E-01	2.88E+00	1.04E-01	5.52E-01	1.86E+00	---		3.00E-01		
HPAH	1.58E+00	1.90E+01	4.32E-01	1.70E+00	5.65E+00	---		3.25E+00		
TOTAL PAHs	1.81E+00	2.19E+01	5.36E-01	4.02E+00	1.19E+01	4.00E+00		3.55E+00		

Notes:

+ Chemicals of interest are any chemical measured in at least one sample at a frequency of detection greater than five percent.

(1) - Effects Range Low.

(2) - Midpoint of the ERL and ERM (Effects Range Medium).

(3) - From Table 2 of EPA's EcoTox Threshold ECO Update January, 1999.

(4) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

(5) - Samples 2WSED8, SWSED10, 4WSED2, and 4WSED3 were re-analyzed for antimony, boron, and tin because they were measured at concentrations much higher than the rest of the data although QA/QC indicated that they were acceptable. The re-analysis was run twice with good concurrence between the two re-analyses but with very different values from the original so the first re-analyzed value was used in the UCL calculation.

TABLE 9
EXPOSURE POINT CONCENTRATION (mg/kg)
POND SEDIMENT

Chemicals of Interest[+]	Average	Max Detection	Min Detection	ERL (1)	Midpoint of ERL/ERM (2)	EPA EcoTox Threshold (3)		Exposure Point Concentration	Statistic Used (4)	# of Detects/# of Samples
2,4,6-Trichlorophenol	4.29E-02	4.29E-02	4.29E-02	---	---	---	<	2.69E-02	median	1 of 8
4,4'-DDD	6.76E-04	6.76E-04	6.76E-04	1.22E-03	4.52E-03	---	<	2.00E-02	median	3 of 8
4,4'-DDT	1.27E-03	1.57E-03	1.11E-03	1.19E-03	3.20E-02	1.60E-03	<	1.10E-02	median	1 of 8
Acetone	7.98E-02	7.98E-02	7.98E-02	1.67E+02	5.09E+03	---	<	4.25E-02	median	1 of 8
Aluminum	1.17E+04	1.63E+04	7.99E+03	---	---	---		1.40E+04	95% Student's-t	8 of 8
Antimony	1.41E+00	1.85E+00	3.30E-01	---	---	---	<	4.40E-01	median	8 of 8
Arsenic	3.76E+00	5.01E+00	3.39E+00	8.20E+00	3.91E+01	8.20E+00	<	3.35E-01	median	3 of 8
Barium	1.99E+02	4.17E+02	1.08E+02	---	---	---		3.83E+02	95% Chebyshev	8 of 8
Benzo(b)fluoranthene	5.37E-02	1.06E-01	2.93E-02	---	---	---	<	3.38E-02	median	6 of 8
Benzo(g,h,i)perylene	1.35E-01	1.35E-01	1.35E-01	---	---	---	<	1.59E-02	median	1 of 8
Benzo(k)fluoranthene	1.14E-01	1.30E-01	1.10E-01	---	---	---	<	2.75E-02	median	3 of 8
Beryllium	8.34E-01	1.13E+00	5.80E-01	---	---	---		9.72E-01	95% Student's-t	8 of 8
beta-BHC	6.99E-04	6.99E-04	6.99E-04	---	---	---	<	2.30E-02	median	1 of 8
Boron	1.73E+01	2.84E+01	1.10E+01	---	---	---	<	1.24E+01	median	5 of 8
Bromomethane	1.61E-02	3.10E-02	1.40E-02	---	---	---	<	1.35E-02	median	2 of 8
Cadmium	2.13E-01	2.70E-01	1.90E-01	1.20E+00	5.40E+00	1.20E+00	<	1.90E-01	median	5 of 8
Carbon Disulfide	7.71E-03	7.71E-03	7.71E-03	---	---	---	<	9.60E-04	median	1 of 8
Chromium	1.29E+01	2.01E+01	8.29E+00	8.10E+01	2.26E+02	8.10E+01		1.60E+01	95% Student's-t	8 of 8
Chrysene	2.57E-02	2.57E-02	2.57E-02	3.84E-01	1.59E+00	---	<	1.40E-02	median	1 of 8
Cobalt	6.94E+00	8.99E+00	5.19E+00	---	---	---		7.86E+00	95% Student's-t	8 of 8
Copper	1.52E+01	2.68E+01	8.33E+00	3.40E+01	1.52E+02	3.40E+01		2.02E+01	95% Student's-t	8 of 8
Iron	1.53E+04	2.01E+04	1.13E+04	---	---	---		1.74E+04	95% Student's-t	8 of 8
Lead	1.75E+01	3.05E+01	1.06E+01	4.67E+01	1.32E+02	4.70E+01		2.23E+01	95% Student's-t	8 of 8
Lithium	1.85E+01	2.37E+01	1.35E+01	---	---	---		2.12E+01	95% Student's-t	8 of 8
m,p-Cresol	3.75E-02	3.75E-02	3.75E-02	---	---	---	<	2.34E-02	median	1 of 8
Manganese	4.88E+02	7.11E+02	3.52E+02	---	---	---		5.71E+02	95% Student's-t	8 of 8
Methyl Iodide	4.10E-02	4.10E-02	4.10E-02	---	---	---	<	7.84E-03	median	1 of 8
Molybdenum	2.59E-01	6.00E-01	2.10E-01	---	---	---	<	1.20E-01	median	2 of 8
Nickel	1.63E+01	2.06E+01	1.23E+01	2.09E+01	3.63E+01	2.10E+01		1.84E+01	95% Student's-t	8 of 8
Pyrene	2.13E-02	2.65E-02	2.01E-02	6.65E-01	1.63E+00	6.60E-01	<	1.96E-02	median	3 of 8
Strontium	1.04E+02	1.81E+02	6.33E+01	---	---	---		1.32E+02	95% Student's-t	8 of 8
Titanium	3.00E+01	4.05E+01	1.91E+01	---	---	---		3.54E+01	95% Student's-t	8 of 8
Vanadium	2.18E+01	2.74E+01	1.68E+01	---	---	---		2.46E+01	95% Student's-t	8 of 8
Zinc	3.32E+02	9.99E+02	3.82E+01	1.50E+02	2.80E+02	1.50E+02		9.61E+02	95% Chebyshev	8 of 8
LPAH[++]				---	---	---				
HPAHs	3.50E-01	4.23E-01	3.20E-01	1.70E+00	5.65E+00			1.11E-01		
Total PAHs	3.50E-01	3.50E-01	3.50E-01	4.02E+00	2.44E+01	4.00E+00		1.11E-01		

Notes:

[+] Chemicals of interest are any chemical measured in at least one sample.

[++] No LPAHs were detected in the samples.

(1) - Effects Range Low.

(2) - Midpoint of the ERL and ERM (Effects Range Medium).

(3) - From Table 2 of EPA's EcoTox Threshold ECO Update January, 1999.

(4) - Recommended exposure point concentration to be used based on data distribution per Pro UCL (see Appendix A).

TABLE 10
EXPOSURE POINT CONCENTRATION (mg/L)
INTRACOASTAL WATERWAY SURFACE WATER (TOTAL)

Chemicals of Interest+	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water (1)	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
Acrylonitrile	9.38E-04	2.10E-03	2.10E-03	2.91E-01	2.10E-03	EPC is max detect	1 of 4
Aluminum	4.05E-01	5.50E-01	2.80E-01	---	5.50E-01	EPC is max detect	4 of 4
Barium	2.40E-02	2.60E-02	2.20E-02	2.50E+01	2.60E-02	EPC is max detect	4 of 4
Boron	4.69E+00	4.81E+00	4.60E+00	---	4.81E+00	EPC is max detect	4 of 4
Chromium	7.98E-02	1.20E-01	7.00E-02	---	1.20E-01	EPC is max detect	4 of 4
Copper	6.53E-03	1.10E-02	9.10E-03	---	1.10E-02	EPC is max detect	2 of 4
Iron	4.63E-01	5.90E-01	3.20E-01	---	5.90E-01	EPC is max detect	4 of 4
Lithium	2.53E-01	2.70E-01	2.20E-01	---	2.70E-01	EPC is max detect	4 of 4
Manganese	4.03E-02	4.80E-02	3.30E-02	---	4.80E-02	EPC is max detect	4 of 4
Silver	2.80E-03	3.70E-03	2.80E-03	---	3.70E-03	EPC is max detect	3 of 4
Strontium	7.22E+00	7.35E+00	6.95E+00	---	7.35E+00	EPC is max detect	4 of 4
Titanium	3.90E-03	5.70E-03	2.00E-03	---	5.70E-03	EPC is max detect	4 of 4
Vanadium	4.25E-02	6.10E-02	3.50E-02	---	6.10E-02	EPC is max detect	4 of 4

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) - From Table 3-2 of TCEQ, 2006 and only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE 11
EXPOSURE POINT CONCENTRATION (mg/L)
INTRACOASTAL WATERWAY BACKGROUND SURFACE WATER (TOTAL)

Chemicals of Interest+	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water (1)	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
4,4'-DDD	3.30E-06	7.62E-06	3.60E-06	2.50E-05	7.62E-06	EPC is max detect	2 of 4
4,4'-DDT	4.93E-06	1.30E-05	1.30E-05	1.00E-06	1.30E-05	EPC is max detect	1 of 4
Acetone	1.47E-03	4.52E-03	4.52E-03	2.82E+02	4.52E-03	EPC is max detect	1 of 4
Aldrin	9.24E-06	1.10E-05	4.40E-06	1.30E-04	1.10E-05	EPC is max detect	4 of 4
Aluminum	2.44E-01	4.00E-01	2.10E-01	---	4.00E-01	EPC is max detect	4 of 4
Barium	1.96E-02	2.00E-02	2.00E-02	2.50E+01	2.00E-02	EPC is max detect	4 of 4
Benzo(g,h,i)perylene	1.20E-04	2.02E-04	2.02E-04	---	2.02E-04	EPC is max detect	1 of 4
Benzo(k)fluoranthene	1.73E-04	3.11E-04	3.11E-04	---	3.11E-04	EPC is max detect	1 of 4
Bis(ethylhexyl) Phthalate	4.17E-03	1.97E-02	1.94E-02	---	1.97E-02	EPC is max detect	2 of 4
Boron	4.38E+00	4.50E+00	4.27E+00	---	4.50E+00	EPC is max detect	4 of 4
Chromium	7.84E-02	7.90E-02	7.80E-02	---	7.90E-02	EPC is max detect	4 of 4
Chromium VI	6.20E-03	1.10E-02	1.10E-02	---	1.10E-02	EPC is max detect	1 of 4
Chrysene	1.61E-04	3.68E-04	3.68E-04	---	3.68E-04	EPC is max detect	1 of 4
Di-n-butyl Phthalate	6.70E-04	1.42E-03	8.28E-04	5.00E-03	1.42E-03	EPC is max detect	2 of 4
Di-n-octyl Phthalate	2.65E-04	6.50E-04	6.50E-04	---	6.50E-04	EPC is max detect	1 of 4
Iron	3.40E-01	4.30E-01	3.40E-01	---	4.30E-01	EPC is max detect	4 of 4
Lithium	3.00E-01	3.40E-01	2.70E-01	---	3.40E-01	EPC is max detect	4 of 4
Manganese	3.60E-02	4.10E-02	3.40E-02	---	4.10E-02	EPC is max detect	4 of 4
Methoxyclor	3.66E-06	1.40E-05	1.40E-05	3.00E-05	1.40E-05	EPC is max detect	1 of 4
Molybdenum	2.72E-03	4.20E-03	1.80E-03	---	4.20E-03	EPC is max detect	2 of 4
Silver	5.43E-03	5.90E-03	4.70E-03	---	5.90E-03	EPC is max detect	4 of 4
Strontium	7.76E+00	8.31E+00	7.31E+00	---	8.31E+00	EPC is max detect	4 of 4
Titanium	2.98E-03	4.20E-03	2.40E-03	---	4.20E-03	EPC is max detect	4 of 4
Vanadium	4.14E-02	3.70E-02	1.10E-02	---	3.70E-02	EPC is max detect	4 of 4
LPAHs++				---			
HPAHs	4.55E-04	8.81E-04	8.81E-04	---	8.81E-04		
Total PAHs	4.55E-04	4.55E-04	4.55E-04	---	4.55E-04		

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
++ No LPAHs were detected in the samples.
(1) - From Table 3-2 of TCEQ, 2006 and only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE 12
EXPOSURE POINT CONCENTRATION (mg/L)
WETLAND SURFACE WATER (TOTAL)

Chemicals of Interest[+]	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water [(1)]	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
1,2-Dichloroethane	2.30E-03	3.85E-03	2.55E-03	5.65E+00	3.85E-03	EPC is max detect	3 of 4
Acrolein	1.21E-02	9.29E-03	9.29E-03	5.00E-03	9.30E-03	EPC is max detect*	1 of 4
Aluminum	5.08E-01	8.00E-01	1.70E-01	---	8.00E-01	EPC is max detect	4 of 4
Barium	2.20E-01	3.70E-01	1.50E-01	2.50E+01	3.70E-01	EPC is max detect	4 of 4
Boron	1.96E+00	2.42E+00	8.30E-01	---	2.42E+00	EPC is max detect	4 of 4
Chromium	1.49E-02	3.70E-02	2.00E-02	---	3.70E-02	EPC is max detect	2 of 4
Chromium VI	3.13E-03	8.00E-03	8.00E-03	---	8.00E-03	EPC is max detect	1 of 4
Copper	6.38E-03	1.10E-02	9.50E-03	---	1.10E-02	EPC is max detect	2 of 4
Iron	6.45E-01	1.08E+00	1.90E-01	---	1.08E+00	EPC is max detect	4 of 4
Lithium	1.89E-01	2.50E-01	5.70E-02	---	2.50E-01	EPC is max detect	4 of 4
Manganese	1.37E-01	3.40E-01	1.80E-02	---	3.40E-01	EPC is max detect	4 of 4
Mercury	3.75E-05	7.00E-05	4.00E-05	1.10E-03	7.00E-05	EPC is max detect	2 of 4
Molybdenum	9.30E-03	1.50E-02	5.60E-03	---	1.50E-02	EPC is max detect	3 of 4
Nickel	1.10E-03	2.20E-03	1.20E-03	---	2.20E-03	EPC is max detect	2 of 4
Strontium	5.27E+00	6.64E+00	1.87E+00	---	6.64E+00	EPC is max detect	4 of 4
Titanium	6.40E-03	9.80E-03	2.40E-03	---	9.80E-03	EPC is max detect	4 of 4
Zinc	7.30E-03	2.20E-02	2.20E-02	---	2.20E-02	EPC is max detect	1 of 4

Notes:
*The maximum detected value is sometimes lower than the average since 1/2 of the reporting limit was used as a proxy value when it was not detected, and because J flag data were used in the risk assessment.
[+] Chemicals of interest are any chemical measured in at least one sample.
(1) - From Table 3-2 of TCEQ, 2006 and only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE 13
EXPOSURE POINT CONCENTRATION (mg/L)
POND SURFACE WATER (TOTAL)

Chemicals of Interest+	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water (1)	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
4-Chloroaniline	2.79E-04	8.23E-04	8.23E-04	---	8.00E-04	EPC is max detect	1 of 6
Aluminum	9.13E-01	2.22E+00	4.10E-01	---	2.22E+00	EPC is max detect	5 of 6
Antimony	3.82E-03	7.60E-03	3.00E-03	---	7.60E-03	EPC is max detect	3 of 6
Arsenic	5.40E-03	1.30E-02	1.20E-02	---	1.30E-02	EPC is max detect	2 of 6
Barium	1.45E-01	1.90E-01	1.30E-01	2.50E+01	1.90E-01	EPC is max detect	6 of 6
Benzo(a)pyrene	1.12E-04	3.48E-04	3.48E-04	---	3.00E-04	EPC is max detect	1 of 6
Benzo(b)fluoranthene	4.03E-04	1.81E-03	1.81E-03	---	1.80E-03	EPC is max detect	1 of 6
Benzo(g,h,i)perylene	3.71E-04	1.73E-03	1.73E-03	---	1.70E-03	EPC is max detect	1 of 6
Benzo(k)fluoranthene	2.06E-04	5.42E-04	5.42E-04	---	5.00E-04	EPC is max detect	1 of 6
Bis(2-ethylhexyl)phthalate	1.92E-02	4.00E-02	2.90E-02	---	4.00E-02	EPC is max detect	3 of 6
Boron	2.97E+00	3.52E+00	2.45E+00	---	3.52E+00	EPC is max detect	6 of 6
Chromium	8.50E-04	1.50E-03	1.50E-03	---	1.50E-03	EPC is max detect	1 of 6
Chromium VI	8.50E-03	1.60E-02	1.50E-02	---	1.60E-02	EPC is max detect	2 of 6
Chrysene	2.48E-04	7.10E-04	7.10E-04	---	7.00E-04	EPC is max detect	1 of 6
Cobalt	9.12E-04	3.20E-03	5.20E-04	---	3.20E-03	EPC is max detect	2 of 6
Dibenz(a,h)anthracene	6.26E-04	3.04E-03	3.04E-03	---	3.00E-03	EPC is max detect	1 of 6
Di-n-butyl Phthalate	3.12E-03	3.81E-03	1.07E-03	5.00E-03	3.80E-03	EPC is max detect	5 of 6
Indeno(1,2,3-cd)pyrene	6.73E-04	3.44E-03	3.44E-03	---	3.40E-03	EPC is max detect	1 of 6
Iron	2.27E+00	6.67E+00	5.20E-01	---	6.67E+00	EPC is max detect	6 of 6
Lead	2.63E-03	1.10E-02	1.10E-02	---	1.10E-02	EPC is max detect	1 of 6
Lithium	1.16E-01	1.60E-01	6.70E-02	---	1.60E-01	EPC is max detect	6 of 6
Manganese	6.37E-01	1.44E+00	8.50E-02	---	1.44E+00	EPC is max detect	6 of 6
Molybdenum	8.73E-03	1.80E-02	1.30E-02	---	1.80E-02	EPC is max detect	3 of 6
Nickel	4.60E-03	7.90E-03	3.00E-03	---	7.90E-03	EPC is max detect	6 of 6
Selenium	4.26E-03	9.80E-03	9.80E-03	1.36E-01	9.80E-03	EPC is max detect	1 of 6
Silver	9.30E-03	1.50E-02	3.70E-03	---	1.50E-02	EPC is max detect	6 of 6
Strontium	4.47E+00	7.19E+00	1.77E+00	---	7.19E+00	EPC is max detect	6 of 6
Thallium	2.86E-03	7.70E-03	6.20E-03	2.13E-02	7.70E-03	EPC is max detect	2 of 6
Titanium	1.90E-02	4.40E-02	2.10E-03	---	4.40E-02	EPC is max detect	6 of 6
Vanadium	3.20E-03	8.40E-03	4.30E-03	---	8.40E-03	EPC is max detect	3 of 6
Zinc	1.20E-01	6.30E-01	2.70E-02	---	6.30E-01	EPC is max detect	3 of 6
LPAHs				---			
HPAHs	2.64E-03	1.16E-02	1.16E-02	---	1.14E-02		
Total PAHs	2.64E-03	2.64E-03	2.64E-03	---	2.64E-03		

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) - From Table 3-2 of TCEQ, 2006 and only the TCEQ Ecological Benchmarks for Water without the "dissolved" notation were included in the table.

TABLE 14
EXPOSURE POINT CONCENTRATION (mg/L)
INTRACOASTAL WATERWAY SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest+	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water (1)	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
Aluminum	6.48E-02	4.70E-02	4.70E-02	---	4.70E-02	EPC is max detect	1 of 4
Barium	2.63E-02	2.80E-02	2.30E-02	2.50E+01	2.80E-02	EPC is max detect	4 of 4
Boron	4.79E+00	4.99E+00	4.30E+00	---	4.99E+00	EPC is max detect	4 of 4
Lithium	2.10E-01	2.20E-01	2.00E-01	---	2.20E-01	EPC is max detect	4 of 4
Manganese	4.85E-03	6.00E-03	2.50E-03	---	6.00E-03	EPC is max detect	4 of 4
Nickel	2.63E-03	3.30E-03	1.30E-03	1.31E-02	3.30E-03	EPC is max detect	4 of 4
Selenium	4.25E-02	6.30E-02	2.80E-02	1.36E-01	6.30E-02	EPC is max detect	4 of 4
Strontium	8.04E+00	8.47E+00	7.36E+00	---	8.47E+00	EPC is max detect	4 of 4

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) - From Table 3-2 of TCEQ.

TABLE 15
EXPOSURE POINT CONCENTRATION (mg/L)
INTRACOASTAL WATERWAY BACKGROUND SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest+	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
Barium	1.65E-02	1.90E-02	1.20E-02	2.50E+01	1.90E-02	EPC is max detect	4 of 4
Boron	3.98E+00	4.33E+00	3.04E+00	---	4.33E+00	EPC is max detect	4 of 4
Chromium	7.38E-02	7.80E-02	6.40E-02	1.03E-01	7.80E-02	EPC is max detect	4 of 4
Iron	5.40E-02	6.00E-02	6.00E-02	---	6.00E-02	EPC is max detect	1 of 4
Lithium	2.90E-01	3.90E-01	1.90E-01	---	3.90E-01	EPC is max detect	4 of 4
Manganese	1.53E-02	1.80E-02	1.10E-02	---	1.80E-02	EPC is max detect	4 of 4
Molybdenum	3.68E-03	3.90E-03	3.90E-03	---	3.90E-03	EPC is max detect	1 of 4
Silver	5.23E-03	5.80E-03	4.30E-03	1.90E-04	5.80E-03	EPC is max detect	4 of 4
Strontium	6.84E+00	7.46E+00	5.20E+00	---	7.46E+00	EPC is max detect	4 of 4
Vanadium	1.23E-02	1.50E-02	9.30E-03	---	1.50E-02	EPC is max detect	4 of 4

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) - From Table 3-2 of TCEQ.

TABLE 16
EXPOSURE POINT CONCENTRATION (mg/L)
WETLAND SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest[+]	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water [(1)]	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
Barium	3.20E-04	3.50E-01	1.40E-01	2.50E+01	3.50E-01	EPC is max detect	4 of 4
Boron	2.70E-02	2.75E+00	8.50E-01	---	2.75E+00	EPC is max detect	4 of 4
Chromium	1.20E-03	3.70E-02	1.90E-02	1.03E-01	3.70E-02	EPC is max detect	2 of 4
Copper	2.50E-03	1.10E-02	5.30E-03	3.60E-03	1.10E-02	EPC is max detect	3 of 4
Lithium	3.50E-03	2.80E-01	5.70E-02	---	2.80E-01	EPC is max detect	4 of 4
Manganese	6.00E-04	3.30E-01	2.50E-02	---	3.30E-01	EPC is max detect	4 of 4
Molybdenum	2.70E-03	1.70E-02	5.40E-03	---	1.70E-02	EPC is max detect	3 of 4
Nickel	4.50E-04	1.30E-03	4.90E-04	1.31E-02	1.30E-03	EPC is max detect	2 of 4
Strontium	9.40E-04	7.01E+00	1.89E+00	---	7.01E+00	EPC is max detect	4 of 4

Notes:
[+] Chemicals of interest are any chemical measured in at least one sample.
(1) From Table 3-2 of TCEQ, 2006.

TABLE 17
EXPOSURE POINT CONCENTRATION (mg/L)
POND SURFACE WATER (DISSOLVED METALS)

Chemicals of Interest+	Average	Max Detection	Min Detection	TCEQ Ecological Benchmark for Water (1)	Exposure Point Concentration	Statistic Used	# of Detects/# of Samples
Antimony	3.50E-03	6.30E-03	3.10E-03	---	6.30E-03	EPC is max detect	3 of 6
Barium	1.25E-01	1.30E-01	1.20E-01	---	1.30E-01	EPC is max detect	6 of 6
Boron	2.79E+00	3.33E+00	2.36E+00	---	3.33E+00	EPC is max detect	6 of 6
Lithium	1.45E-01	2.20E-01	8.00E-02	---	2.20E-01	EPC is max detect	6 of 6
Manganese	4.65E-01	1.06E+00	6.60E-02	---	1.06E+00	EPC is max detect	6 of 6
Molybdenum	1.01E-02	1.90E-02	1.80E-02	---	1.90E-02	EPC is max detect	3 of 6
Nickel	1.43E-03	2.60E-03	1.90E-03	1.31E-01	2.60E-03	EPC is max detect	3 of 6
Silver	1.83E-03	2.90E-03	9.40E-04	1.90E-04	2.90E-03	EPC is max detect	6 of 6
Strontium	4.32E+00	6.97E+00	1.78E+00	---	6.97E+00	EPC is max detect	6 of 6
Thallium	1.53E-03	3.20E-03	1.40E-03	---	3.20E-03	EPC is max detect	3 of 6
Vanadium	7.58E-04	2.10E-03	2.10E-03	---	2.10E-03	EPC is max detect	1 of 6

Notes:
+ Chemicals of interest are any chemical measured in at least one sample.
(1) From Table 3-2 of TCEQ, 2006.

TABLE 18
TERRESTRIAL HABITAT ASSESSMENT AND MEASUREMENT ENDPOINTS

Guild	Receptor of Potential Concern	Assessment Endpoint for SLERA	Ecological Risk Question	Testable Hypothesis for SLERA	Measurement Endpoint
Plants	Terrestrial plants	Protection of vegetation survival growth, and reproduction due to uptake of chemicals in soil.	1) Does exposure to chemicals in soil adversely affect the survival, growth, and reproduction of plants?	Maximum soil concentrations do not exceed plant-based screening criteria, when available.	1) Comparison of maximum concentration for each compound measured at the Site in soil to plant-based screening levels. 2) Evaluate the likelihood of localized effects.
Invertebrates	Earthworm	Protection of soil invertebrate community from uptake and direct toxic effects on detritivore abundance, diversity, productivity due to chemicals in soil.	1) Does exposure to chemicals in soil adversely affect the abundance, diversity, productivity, and function? 2) Do soil-to-earthworm BAFs suggest uptake of chemicals?	Maximum soil concentrations do not exceed screening criteria.	1) Comparison of maximum concentration for each compound measured at the Site in soil to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioconcentrate. 3) Evaluate likelihood of localized effects (maximum concentration).
Small mammalian herbivore	Deer mouse	Protection of the small mammal survival, growth, and reproduction due to uptake of chemicals in soil.	1) Does exposure to chemicals in soil adversely affect the survival, growth, and reproduction? 2) Do soil-to-mammal BAFs suggest uptake of chemicals?	95% UCL intake levels do not exceed TRVs.	1) Comparison of 95% UCL concentration for each compound measured at the Site in soil to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioaccumulate.
Small mammalian omnivore	Least shrew	Protection of the small mammal survival, growth, and reproduction due to uptake of chemicals in soil.	1) Does exposure to chemicals in soil adversely affect the survival, growth, and reproduction? 2) Do soil-to-mammal BAFs suggest uptake of chemicals?	95% UCL intake levels do not exceed TRVs.	1) Comparison of 95% UCL concentration for each compound measured at the Site in soil to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioaccumulate.
Large mammalian carnivore	Coyote	Protection of the mammalian predator survival, growth, and reproduction due to the uptake of chemicals in prey items.	1) Does exposure to chemicals in soil adversely affect the survival, growth, and reproduction? 2) Do soil-to-mammal BAFs suggest uptake of chemicals?	95% UCL intake levels do not exceed TRVs.	1) Comparison of 95% UCL concentration for each compound measured at the Site in soil to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioaccumulate.
Reptilian carnivore	Rat snake	Protection of the reptilian predator survival, growth, and reproduction due to the uptake of chemicals in prey items.	1) Does exposure to chemicals in soil adversely affect the survival, growth, and reproduction? 2) Do soil-to-mammal BAFs suggest uptake of chemicals?	Does the qualitative weight-of-evidence suggest an adverse risk?	1) Evaluate habitat, food resources, other stressors, and toxicological information for reptiles and draw conclusions of potential risk based on this information.
Avian herbivore/omnivore	American robin	Protection of the omnivorous avian survival, growth, and reproduction due to uptake of chemicals in soil.	1) Does exposure to chemicals in soil adversely affect the survival, growth, and reproduction? 2) Do soil-to-avian omnivore BAFs suggest uptake of chemicals?	95% UCL intake levels do not exceed TRVs.	1) Comparison of 95% UCL concentration for each compound measured at the Site in soil to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioaccumulate.
Large avian carnivore	Red-tailed hawk	Protection of carnivorous avian community population abundance, diversity, and productivity due to uptake of chemicals in prey items.	1) Does exposure to chemicals in soil adversely affect the survival, growth, and reproduction? 2) Do soil-to-higher trophic level BAFs suggest uptake of chemicals and/or bioaccumulation?	95% UCL intake levels do not exceed TRVs.	1) Comparison of 95% UCL concentration for each compound measured at the Site in soil to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioaccumulate.

Notes:
SLERA -- Screening-Level Ecological Risk Assessment
BAF -- biota accumulation factor
BSAF -- biota to sediment accumulation factor
NOAEL -- no observable adverse effects level
95% UCL -- 95 percent upper confidence limit on the mean
TRV -- Toxicity Reference Value

TABLE 19
ESTUARINE WETLAND AND AQUATIC HABITAT ASSESSMENT AND MEASUREMENT ENDPOINTS

Receptor Group	Receptor of Potential Concern	Assessment Endpoint for SLERA	Ecological Risk Question	Testable Hypothesis for SLERA	Measurement Endpoint
Benthos and zooplankton	Polychaetes	Protection of benthic invertebrate community from uptake and direct toxic effects on abundance, diversity, and productivity due to chemicals in sediment.	1) Does exposure to chemicals in sediment adversely affect the abundance, diversity, productivity, and function? 2) Do sediment-to-biota BSAFs suggest uptake of chemicals?	Maximum sediment concentrations do not exceed screening criteria.	1) Comparison of maxium concentration for each compound measured at the Site in sediment to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioconcentrate. 3) Evaluate likelihood of localized effects (maximum concentration).
Fish and shellfish	Fiddler crab	Protection of invertebrate community abundance, diversity, and productivity due to uptake of chemicals in sediment.	1) Does exposure to chemical in sediment adversely affect the survival, reproduction, or growth? 2) Do sediment-to-biota BSAFs suggest uptake of chemicals?	95% UCL sediment concentrations do not exceed screening criteria.	1) Comparison of 95% UCL concentration for each compound measured at the Site in sediment to receptor-specific screening level based on ERLs available in the literature. 2) Evaluate compound's ability to bioconcentrate.
	Killifish	Protection of localized herbivorous fish survival, growth, and reproduction due to uptake of chemicals in sediment and biota.	1) Does exposure to chemical in sediment adversely affect the survival, reproduction, or growth? 2) Do sediment-to-biota BSAFs suggest uptake of chemicals?	95% UCL surface water concentrations do not exceed surface water quality standards.	1) Comparison of 95% UCL concentration for each compound measured at the Site in surface to surface water quality standards. 2) Evaluate compound's ability to bioconcentrate.
Carnivorous fish	Black drum	Protection of carnivorous fish survival, growth, and reproduction due to uptake of chemicals in sediment and prey items.	1) Does exposure to chemicals in sediment and/or prey items adversely affect the survival, growth, and reproduction of a first order carnivorous fish? 2) Do sediment-to-biota BSAFs suggest uptake of chemicals and/or bioaccumulation?	95% UCL surface water concentrations do not exceed surface water quality standards.	1) Comparison of 95% UCL concentration for each compound measured at the Site in surface water to surface water quality standards. 2) Evaluate compound's ability to bioconcentrate.
	Spotted seatrout	Protection of carnivorous fish survival, growth, and reproduction due to uptake of chemicals in prey items.	1) Does exposure to chemicals in prey items adversely affect the survival, growth, and reproduction of a second order carnivorous fish? 2) Does sediment-to-biota BSAF suggest bioaccumulation?	95% UCL surface water concentrations do not exceed surface water quality standards.	1) Comparison of 95% UCL concentration for each compound measured at the Site in surface to surface water quality standards. 2) Evaluate compound's ability to bioconcentrate.
Avian carnivore	Sandpiper	Protection of carnivorous avian survival, growth, and reproduction due to uptake of chemicals in sediment and prey items.	1) Does exposure to chemicals in sediment and/or prey items adversely affect the survival, growth,and reproduction of a first order carnivore? 2) Does sediment-to-biota BSAF suggestion uptake or bioaccumulation?	95% UCL sediment concentrations do not exceed screening criteria. 95% UCL intake levels do not exceed TRVs.	1) Comparison of 95% UCL concentration for each compound measured at the Site in sediment to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioaccumulate.
	Green heron	Protection of carnivorous avian survival, growth and reproduction due to uptake of chemicals in prey items.	1) Does exposure to chemicals in prey items adversely affect the survival, growth, and reproduction of a second order carnivore? 2) Does sediment-to-biota BSAF suggestion bioaccumulation?	95% UCL sediment concentrations do not exceed screening criteria. 95% UCL intake levels do not exceed TRVs.	1) Comparison of 95% UCL concentration for each compound measured at the Site in sediment to receptor-specific screening level based on NOAELs available in the literature. 2) Evaluate compound's ability to bioaccumulate.

Notes:
SLERA -- Screening-Level Ecological Risk Assessment
BAF -- biota accumulation factor
BSAF -- biota to sediment accumulation factor
NOAEL -- no observable adverse effects level
95% UCL -- 95 percent upper confidence limit on the mean
ERL -- Effects Range Low

TABLE 20
GUILDS AND REPRESENTATIVE RECEPTORS

Terrestrial Guild	Representative Receptor
Plants	Terrestrial plants
Invertebrates	Earthworm
Small mammalian herbivore	Deer mouse
Small mammalian omnivore	Least shrew
Large mammalian carnivore	Coyote
Reptilian carnivore	Rat snake
Avian herbivore/omnivore	American robin
Large avian carnivore	Red-tailed hawk
Wetland and Aquatic Habitat Guild	**Representative Receptor**
Benthos and zooplankton	Polychaetes
Fish and shellfish	Fiddler crab Killifish
Carnivorous fish	Black drum Spotted seatrout
Avian carnivore	Sandpiper Green heron

TABLE 21
COPECS IDENTIFIED IN STEP 1 AND QUANTITATIVELY EVALUATED IN STEP 2

SOUTH AREA SOIL	NORTH AREA SOIL	BACKGROUND AREA SOIL	ICWW SEDIMENT	BACKGROUND ICWW SEDIMENT	WETLAND SEDIMENT	POND SEDIMENT	ICWW SURFACE WATER	BACKGROUND ICWW SURFACE WATER	WETLAND SURFACE WATER	POND SURFACE WATER
2-Methylnaphthalene*	2-Methylnaphthalene*	**Antimony**	2-Methylnaphthalene*	4,4'-DDT+	**2-Methylnaphthalene***	4,4'-DDD+	Selenium (dissolved)+	4,4'-DDD (total)+	**Acrolein (total)**	Selenium (total)+
4,4-DDD+	4,4'-DDE+	**Barium**	**4,4'-DDT+**	**Arsenic**	**4,4'-DDT+**	**4,4'-DDT+**		**4,4'-DDT (total)+**	**Copper (dissolved)**	**Silver (dissolved)**
4,4'-DDE+	4,4'-DDT+	Benzo(a)anthracene*	**Acenaphthene***	Benzo(b)fluoranthene*	**Acenaphthene***	Benzo(b)fluoranthene*		**Silver (dissolved)**	Mercury (total)+	Thallium (total and dissolved)+
4,4'-DDT+	Acenaphthene*	Benzo(a)pyrene*	Anthracene*	Copper+	**Acenaphthylene***	Benzo(g,h,i)perylene*				
Acenaphthene*	Acenaphthylene*	Benzo(b)fluoranthene*	**Benzo(a)anthracene***	Mercury+	**Anthracene***	Benzo(k)fluoranthene*				
Acenaphthylene*	Anthracene*	Benzo(g,h,i)perylene*	**Benzo(a)pyrene***	**Nickel+**	**Arsenic**	Cadmium+				
Anthracene*	**Antimony**	Benzo(k)fluoranthene*	Benzo(b)fluoranthene*	Zinc+	**Benzo(a)anthracene***	Chrysene*				
Antimony	Aroclor-1254+	Cadmium+	Benzo(g,h,i)perylene*	HPAH*	**Benzo(a)pyrene***	Copper+				
Aroclor-1254+	**Barium**	**Chromium+**	Benzo(k)fluoranthene*	TOTAL PAHs*	Benzo(b)fluoranthene*	Nickel+				
Arsenic	Benzo(a)anthracene*	Chrysene*	**Chrysene***		Benzo(g,h,i)perylene*	Pyrene*				
Barium	Benzo(a)pyrene*	Copper+	Copper+		Benzo(k)fluoranthene*	**Zinc+**				
Benzo(a)anthracene*	Benzo(b)fluoranthene*	Fluoranthene*	**Dibenz(a,h)anthracene***		Cadmium+	HPAH*				
Benzo(a)pyrene*	Benzo(g,h,i)perylene*	Indeno(1,2,3-cd)pyrene*	**Fluoranthene***		**Chrysene***	TOTAL PAHs*				
Benzo(b)fluoranthene*	Benzo(k)fluoranthene*	**Lead+**	**Fluorene***		**Copper+**					
Benzo(g,h,i)perylene*	**Boron**	**Lithium**	gamma-Chlordane+		**Dibenz(a,h)anthracene***					
Benzo(k)fluoranthene*	**Cadmium+**	**Manganese**	Hexachlorobenzene+		**Endosulfan Sulfate**					
Boron	**Chromium+**	Mercury+	Indeno(1,2,3-cd)pyrene*		Endrin Aldehyde+					
Cadmium+	Chrysene*	Phenanthrene*	Mercury+		Endrin Ketone+					
Chromium+	**Copper+**	Pyrene*	Nickel+		**Fluoranthene***					
Chrysene*	Dibenz(a,h)anthracene*	**Zinc+**	**Phenanthrene***		**Fluorene***					
Cobalt	**Dieldrin+**	LPAH*	**Pyrene***		**gamma-Chlordane+**					
Copper+	Endrin +	**HPAH***	Zinc+		Indeno(1,2,3-cd)pyrene*					
Dibenz(a,h)anthracene*	Endrin Ketone+	TOTAL PAHs*	**LPAH***		**Lead**					
Dieldrin+	Fluoranthene*		**HPAH***		Mercury+					
Endrin Aldehyde+	Fluorene*		**TOTAL PAHs***		**Nickel+**					
Endrin Ketone+	Indeno(1,2,3-cd)pyrene*				**Phenanthrene***					
Fluoranthene*	**Lead+**				**Pyrene***					
Fluorene*	**Lithium**				**Zinc+**					
gamma-Chlordane+	**Manganese**				**LPAH***					
Indeno(1,2,3-cd)pyrene*	Mercury+				**HPAH***					
Lead+	**Molybdenum**				**TOTAL PAHs***					
Lithium	Naphthalene*									
Manganese	**Nickel+**									
Mercury+	Phenanthrene*									
Molybdenum	Pyrene*									
Naphthalene*	**Vanadium**									
Nickel+	**Zinc+**									
Phenanthrene*	LPAH*									
Pyrene*	**HPAH***									
Vanadium	TOTAL PAHs*									
Zinc+										
LPAH*										
HPAH*										
TOTAL PAHs*										

Notes:
Bold compounds were retained for further evaluation because their maximum measured concentrations exceeded their screening level.
* Compound was retained for further evaluation because it is a PAH that was measured above the detection limit and at least one other PAH was detected above the screening level for that media.
+ Compound was retained for further evaluation because it is considered bioaccumulative in the given media by TCEQ Table 3-1 (TCEQ, 2006).
Shaded compounds have a maximum concentration measured above the mid-point between the Effects Range Low (ERL) and Effects Range Medium (ERM).

TABLE 22
TERRESTRIAL EXPOSURE PARAMETERS

PARAMETER	Small Mammalian Herbivore (Deer Mouse)		Large Mammalian Carnivore (Coyote)		Small Mammalian Omnivore (Least Shrew)		Avian Herbivore/Omnivore (American Robin)		Large Avian Carnivore (Red-Tailed Hawk)	
	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference
Maximum Ingestion Rate for soil (kg/day)**	1.50E-06	EPA, 1993	4.83E-05	EPA, 1993	2.71E-07	EPA, 1993	2.52E-06	EPA, 1993	8.97E-06	EPA, 1993
Bioavailability Factor in soil (unitless)	1	EPA, 1997	1	EPA, 1997	1	EPA, 1997	1	EPA, 1997	1	EPA, 1997
Default Area Use Factor (unitless)	1	EPA, 1997	1	EPA, 1997	1	EPA, 1997	1	EPA, 1997	1	EPA, 1997
Minimum Body Weight (kg)	1.50E-02	Davis and Schmidly, 2009	1.40E+01	Davis and Schmidly, 2009	4.00E-03	Davis and Schmidly, 2009	6.30E-02	EPA, 1993	9.57E-01	EPA, 1993
Maximum Ingestion Rate for food (kg/day)**	7.49E-05	EPA, 1993	2.41E-03	EPA, 1993	3.38E-06	EPA, 1993	4.85E-05	EPA, 1993	4.48E-04	EPA, 1993
Dietary Fraction for arthropods (unitless)	1.00E-01	Prof. Judg.*	NA		9.00E-01	Prof. Judg.*	4.60E-01	EPA, 1993	NA	
Dietary Fraction for plants, etc. (unitless)	9.00E-01	Prof. Judg.*	NA		1.00E-01	Prof. Judg.*	8.00E-02	EPA, 1993	NA	
Dietary Fraction of small mammals (unitless)	NA		7.50E-01	EPA, 1993	NA		NA		7.85E-01	EPA, 1993
Dietary Fraction of birds (unitless)	NA		2.50E-01	EPA, 1993	NA		NA		2.15E-01	EPA, 1993
Dietary Fraction of earthworms (unitless)	NA		NA		NA		4.60E-01	EPA, 1993	NA	
Maximum Ingestion Rate for water (L/day)	3.39E-03	EPA, 1993	1.27E+00	EPA, 1993	9.54E-04	EPA, 1993	1.12E-02	EPA, 1993	8.42E-02	EPA, 1993

Notes:
NA - not applicable.
* Because of the lack of information on dietary fractions for different species, best professional judgment was used as the basis for the assumption.
** Calculated using the appropriate allometric equations in reference, expressed in dry weight.
Soil ingestion rates are 2% of dietary intake for the deer mouse, coyote, and red-tailed hawk, and 5.2% for the American robin and 8% for the least shrew (Beyer et al., 1994).

TABLE 23
ESTUARINE WETLAND AND AQUATIC EXPOSURE PARAMETERS

PARAMETER	Avian Carnivore (Sandpiper)		Avian Carnivore (Green Heron)	
	Value	Reference	Value	Reference
Maximum Ingestion Rate for soil (kg/day)**	5.34E-06	EPA, 1993	1.88E-06	EPA, 1993
Bioavailability Factor in soil (unitless)	1	EPA, 1997	1	EPA, 1997
Default Area Use Factor (unitless)	1	EPA, 1997	1	EPA, 1997
Minimum Body Weight (kg)	3.40E-02	EPA, 1993	1.77E-01	Sample et al., 1997
Maximum Ingestion Rate for food (kg/day)**	2.81E-05	EPA, 1993	9.40E-05	EPA, 1993
Dietary Fraction for invertebrates (unitless)	NA		NA	
Dietary Fraction for worms (unitless)	6.00E-01	Prof. Judg.*	NA	
Dietary Fraction of crabs (unitless)	4.00E-01	Prof. Judg.*	2.50E-01	Kent, 1986
Dietary Fraction of fish (unitless)	NA		7.50E-01	Kent, 1986
Maximum Ingestion Rate for water (L/day)	7.11E-03	EPA, 1993	2.09E-02	EPA, 1993

Notes:
* Because of the lack of information on dietary fractions for different species, best professional judgment was used.
NA - not applicable.
** Calculated using the appropriate allometric equations in reference, expressed in dry weight.

TABLE 24
ECOLOGICAL HAZARD QUOTIENTS EXCEEDING ONE FOR SOIL

MEDIA	RECEPTOR	CHEMICAL OF POTENTIAL ECOLOGICAL CONCERN	TOXICITY VALUE*	EXPOSURE POINT CONCENTRATION (mg/kg)	BASIS FOR EPC	EHQ
South Area Soil	Invertebrate (Earthworm)	4,4'-DDD	NOAEL	1.12E+00	Maximum	26
		4,4'-DDE	NOAEL	6.93E-02	Maximum	1.6
		4,4'-DDT	NOAEL	1.13E-01	Maximum	2.6
		Aroclor-1254	NOAEL	1.15E+01	Maximum	4.6
		Barium	NOAEL	2.18E+03	Maximum	6.6
		Chromium	NOAEL	1.36E+02	Maximum	2.4
		Copper	NOAEL	4.87E+02	Maximum	6.1
		Zinc	NOAEL	7.65E+03	Maximum	63.8
		Total HPAH	NOAEL	5.66E+01	Maximum	3.2
	Small Mammalian Herbivore (Deer Mouse)	none	NOAEL		95% UCL	<1
	Small Mammalian Omnivore (Least Shrew)	none	NOAEL		95% UCL	<1
	Large Mammalian Carnivore (Coyote)	none	NOAEL		95% UCL	<1
	Avian Herbivore/Omnivore (American Robin)	none	NOAEL		95% UCL	<1
	Large Avian Carnivore (Red-Tailed Hawk)	none	NOAEL		95% UCL	<1
North Area Soil	Invertebrate (Earthworm)	4,4'-DDT	NOAEL	3.95E-01	Maximum	9.2
		Aroclor-1254	NOAEL	6.35E+00	Maximum	2.5
		Barium	NOAEL	4.76E+02	Maximum	1.4
		Chromium	NOAEL	1.28E+02	Maximum	2.3
		Copper	NOAEL	2.00E+02	Maximum	2.5
		Zinc	NOAEL	5.64E+03	Maximum	47
	Small Mammalian Herbivore (Deer Mouse)	none	NOAEL		95% UCL	<1
	Small Mammalian Omnivore (Least Shrew)	none	NOAEL		95% UCL	<1
	Large Mammalian Carnivore (Coyote)	none	NOAEL		95% UCL	<1
	Avian Herbivore/Omnivore (American Robin)	none	NOAEL		95% UCL	<1
	Large Avian Carnivore (Red-Tailed Hawk)	none	NOAEL		95% UCL	<1
Background Area Soil	Invertebrate (Earthworm)	Barium	NOAEL	1.13E+03	Maximum	3.4
		Zinc	NOAEL	9.69E+02	Maximum	8.1
	Small Mammalian Herbivore (Deer Mouse)	none	NOAEL		95% UCL	<1
	Small Mammalian Omnivore (Least Shrew)	none	NOAEL		95% UCL	<1
	Large Mammalian Carnivore (Coyote)	none	NOAEL		95% UCL	<1
	Avian Herbivore/Omnivore (American Robin)	none	NOAEL		95% UCL	<1
	Large Avian Carnivore (Red-Tailed Hawk)	none	NOAEL		95% UCL	<1

Notes:
EHQ - ecological hazard quotient
NOAEL - no observable adverse effects level
HPAH - high molecular weight polynuclear aromatic hydrocarbon
95% UCL - 95th percentile upper confidence limit on the mean
*See Tables C-3, D-3, and E-2 in Appendices for further information about the toxicity reference values used in the risk calculations.

TABLE 25
ECOLOGICAL HAZARD QUOTIENTS EXCEEDING ONE FOR SEDIMENT AND SURFACE WATER

MEDIA	RECEPTOR	CHEMICAL OF POTENTIAL ECOLOGICAL CONCERN	TOXICITY VALUE*	EXPOSURE POINT CONCENTRATION (mg/kg)	BASIS FOR EPC	EHQ
Intracoastal Waterway	Polychaetes (*Capitella capitata*)	4,4'-DDT	ERL	3.32E-03	Maximum	3.3
		Acenaphthene	ERL	6.31E-02	Maximum	1.4
		Benzo(a)anthracene	ERL	3.95E-01	Maximum	1.5
		Chrysene	ERL	4.75E-01	Maximum	1.2
		Dibenz(a,h)anthracene	ERL	2.35E-01	Maximum	3.7
		Fluoranthene	ERL	8.04E-01	Maximum	1.3
		Fluorene	ERL	4.60E-02	Maximum	2.4
		Hexachlorobenzene	AET	3.19E-02	Maximum	5.3
		Phenanthrene	ERL	5.08E-01	Maximum	2.1
		Pyrene	ERL	8.62E-01	Maximum	1.3
		LPAH	ERL	7.10E-01	Maximum	1.3
		HPAH	ERL	4.91E+00	Maximum	2.9
		Total PAH	ERL	5.62E+00	Maximum	1.4
		Dibenz(a,h)anthracene	midpoint ERL/ERM	2.35E-01	Maximum	1.5
	Avian Carnivore (Sandpiper)	none	NOAEL		95% UCL	<1
	Avian Carnivore (Green Heron)	none	NOAEL		95% UCL	<1
Background Intracoastal Waterway						
	Polychaetes (*Capitella capitata*)	Arsenic	ERL	9.62E+00	Maximum	1.1
		Nickel	ERL	2.73E+01	Maximum	1.3
		none	midpoint ERL/ERM			<1
	Avian Carnivore (Sandpiper)	none	NOAEL		95% UCL	<1
	Avian Carnivore (Green Heron)	none	NOAEL		95% UCL	<1
Wetlands	Polychaetes (*Capitella capitata*)	2-Methylnaphthalene	ERL	4.30E-01	Maximum	6.1
		4,4'-DDT	ERL	9.22E-03	Maximum	7.8
		Acenaphthene	ERL	1.33E-01	Maximum	8.3
		Acenaphthylene	ERL	5.45E-01	Maximum	12.4
		Anthracene	ERL	3.34E-01	Maximum	3.9
		Arsenic	ERL	1.28E+01	Maximum	1.6
		Benzo(a)anthracene	ERL	9.93E-01	Maximum	3.8
		Benzo(a)pyrene	ERL	1.30E+00	Maximum	3
		Benzo(g,h,i)perylene	AET	1.94E+00	Maximum	2.9
		Chrysene	ERL	4.05E+00	Maximum	10.5
		Copper	ERL	4.90E+01	Maximum	1.4
		Dibenz(a,h)anthracene	ERL	2.91E+00	Maximum	45.9
		Endrin Aldehyde	ERL	1.00E-02	Maximum	3.8
		Endrin Ketone	ERL	1.30E-02	Maximum	4.9
		Fluoranthene	ERL	2.17E+00	Maximum	3.6
		Fluorene	ERL	1.39E-01	Maximum	7.3
		gamma-Chlordane	ERL	3.60E-03	Maximum	1.6
		Indeno(1,2,3-cd)pyrene	AET	1.94E+00	Maximum	3.2
		Lead	ERL	2.37E+02	Maximum	5.1
		Nickel	ERL	2.77E+01	Maximum	1.3
		Phenanthrene	ERL	1.30E+00	Maximum	5.4
		Pyrene	ERL	1.64E+00	Maximum	2.5
		Zinc	ERL	9.03E+02	Maximum	6
		LPAH	ERL	1.15E+00	Maximum	2.1
		HPAH	ERL	1.39E+01	Maximum	8.2
		TOTAL PAHs	ERL	1.51E+01	Maximum	3.8
		2-Methylnaphthalene	midpoint ERL/ERM	4.30E-01	Maximum	1.2
		Acenaphthylene	midpoint ERL/ERM	5.45E-01	Maximum	1.6
		Benzo(a)anthracene	midpoint ERL/ERM	9.93E-01	Maximum	1.1
		Benzo(a)pyrene	midpoint ERL/ERM	1.30E+00	Maximum	1.3
		Chrysene	midpoint ERL/ERM	4.04E+00	Maximum	2.5
		Dibenz(a,h)anthracene	midpoint ERL/ERM	2.91E+00	Maximum	18
		Lead	midpoint ERL/ERM	2.37E+02	Maximum	1.8
		Phenanthrene	midpoint ERL/ERM	1.30E+00	Maximum	1.5
		Zinc	midpoint ERL/ERM	9.03E+02	Maximum	3.2
		HPAH	midpoint ERL/ERM	1.39E+01	Maximum	2.5
	Avian Carnivore (Sandpiper)	none	NOAEL		95% UCL	<1
	Avian Carnivore (Green Heron)	none	NOAEL		95% UCL	<1
Pond	Polychaetes (*Capitella capitata*)	4,4'-DDT	ERL	1.57E-03	Maximum	1.3
		Zinc	ERL	9.99E+02	Maximum	6.7
		Zinc	midpoint ERL/ERM	9.99E+02	Maximum	3.6
	Avian Carnivore (Sandpiper)	Lead	NOAEL		Maximum	1.2
	Avian Carnivore (Green Heron)	none	NOAEL		95% UCL	<1

Notes:
ERL - effects range low
ERM - effects range medium
AET - apparent effects threshold
EHQ - ecological hazard quotient
NOAEL - no observable adverse effects level
PAH - polynuclear aromatic hydrocarbon
LPAH - low-molecular weight PAH
HPAH - high-molecular weight PAH
95% UCL - 95th percentile upper confidence limit on the mean
*See Tables F-2, G-2, H-2, and I-2 in Appendices for further information about the toxicity reference values used in the risk calculations.

TABLE 26
COMPOUNDS LACKING SOIL TOXICITY REFERENCE VALUES

Parameter	Invertebrate (Earthworm)	Small Mammalian Herbivore (Deer Mouse)	Large Mammalian Carnivore (Coyote)	Small Mammalian Omnivore (Least Shrew)	Avian Herbivore/Omnivore (American Robin)	Large Avian Carnivore (Red-tailed Hawk)
2-Methylnaphthalene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
4,4'-DDD	V	V	V	V	V	V
4,4'-DDE	V	V	V	V	V	V
4,4'-DDT	V	V	V	V	V	V
Acenaphthene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Acenaphthylene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Anthracene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Antimony	V	V	V	V	**NV**	**NV**
Aroclor-1254	V	V	V	V	V	V
Arsenic	V	V	V	V	V	V
Barium	V	V	V	V	V	V
Benzo(a)anthracene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Benzo(a)pyrene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Benzo(b)fluoranthene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Benzo(g,h,i)perylene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Benzo(k)fluoranthene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Boron	**NV**	V	V	V	V	V
Cadmium	V	V	V	V	V	V
Chromium	V	V	V	V	V	V
Chrysene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Cobalt	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Copper	V	V	V	V	V	V
Dibenz(a,h)anthracene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Dieldrin	**NV**	V	V	V	V	V
Endrin	**NV**	V	V	V	V	V
Endrin Aldehyde	**NV**	V	V	V	V	V
Endrin Ketone	**NV**	V	V	V	V	V
Fluoranthene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Fluorene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
gamma-Chlordane	**NV**	V	V	V	V	V
Indeno(1,2,3-cd)pyrene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Lead	V	V	V	V	V	V
Lithium	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Manganese	**NV**	**NV**	**NV**	**NV**	V	V
Mercury	V	V	V	V	V	V
Molybdenum	**NV**	**NV**	**NV**	**NV**	V	V
Naphthalene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Nickel	V	V	V	V	V	V
Phenanthrene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Pyrene	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**
Vanadium	V	V	V	V	V	V
Zinc	V	V	V	V	V	V
LPAH	V	V	V	V	**NV**	**NV**
HPAH	V	V	V	V	**NV**	**NV**
TOTAL PAHs	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**

Notes:
NV - No toxicity reference value available.
V - Value available and provided in Appendices C, D and E.

TABLE 27
COMPOUNDS LACKING SEDIMENT TOXICITY REFERENCE VALUES

Parameter	Polychaete (Capitella Capitata)	Avian Carnivore (Sandpiper)	Avian Carnivore (Green Heron)
2-Methylnaphthalene	V	**NV**	**NV**
4,4'-DDD	V	V	V
4,4'-DDT	V	V	V
Acenaphthene	V	**NV**	**NV**
Acenaphthylene	V	**NV**	**NV**
Anthracene	V	**NV**	**NV**
Arsenic	V	**NV**	**NV**
Benzo(a)anthracene	V	**NV**	**NV**
Benzo(a)pyrene	V	**NV**	**NV**
Benzo(b)fluoranthene	V	**NV**	**NV**
Benzo(g,h,i)perylene	V	**NV**	**NV**
Benzo(k)fluoranthene	V	**NV**	**NV**
Cadmium	V	V	V
Chrysene	V	**NV**	**NV**
Copper	V	V	V
Dibenz(a,h)anthracene	V	**NV**	**NV**
Endosulfan Sulfate	**NV**	**NV**	**NV**
Endrin Aldehyde	V	V	V
Endrin Ketone	V	V	V
Fluoranthene	V	**NV**	**NV**
Fluorene	V	**NV**	**NV**
gamma-Chlordane	V	V	V
Hexachlorobenzene	V	V	V
Indeno(1,2,3-cd)pyrene	V	**NV**	**NV**
Lead	V	V	V
Mercury	V	V	V
Nickel	V	V	V
Phenanthrene	V	**NV**	**NV**
Pyrene	V	**NV**	**NV**
Zinc	V	V	V
LPAH	V	**NV**	**NV**
HPAH	V	**NV**	**NV**
Total PAHs	V	**NV**	**NV**

Notes:
NV - No toxicity reference value available.
V - Value available and provided in Appendices F, G, H and I.

TABLE 28
COMPOUNDS LACKING SEDIMENT TOXICITY REFERENCE VALUES

Parameter	Water Quality Standard
1,2-Dichloroethane (total)	V
4-Chloroaniline (total)	**NV**
4,4'-DDD (total)	V
4,4'-DDT (total)	V
Acetone (total)	V
Acrolein (total)	V
Acrylonitrile (total)	V
Aldrin (total)	V
Aluminum (total and dissolved)	**NV**
Antimony (total and dissolved)	**NV**
Arsenic (total)	**NV**
Barium (total and dissolved)	V
Benzo(a)pyrene (total)	**NV**
Benzo(b)fluoranthene (total)	**NV**
Benzo(g,h,i)perylene (total)	**NV**
Benzo(k)fluoranthene (total)	**NV**
Bis(ethylhexyl) Phthalate (total)	**NV**
Boron (total and dissolved)	**NV**
Chromium (total and dissolved)	V for dissolved
Chromium VI (total)	**NV**
Chrysene (total)	**NV**
Cobalt (total)	**NV**
Copper (total and dissolved)	V for dissolved
Dibenz(a,h)anthracene (total)	**NV**
Di-n-butyl Phthalate (total)	V
Di-n-octyl Phthalate (total)	**NV**
Indeno(1,2,3-cd)pyrene (total)	**NV**
Iron (total and dissolved)	**NV**
Lead (total)	**NV**
Lithium (total and dissolved)	**NV**
Manganese (total and dissolved)	**NV**
Mercury (total)	V
Methoxyclor (total)	**NV**
Molybdenum (total and dissolved)	**NV**
Nickel (total and dissolved)	V for dissolved
Selenium (total and dissolved)	V
Silver (total and dissolved)	V for dissolved
Strontium (total and dissolved)	**NV**
Thallium (total and dissolved)	V
Titanium (total)	**NV**
Vanadium (total and dissolved)	**NV**
Zinc (total)	**NV**
HPAHs (total)	**NV**
Total PAHs (total)	**NV**

Notes:
NV - No toxicity reference value available.
V - Value available.

TABLE 29
COPECS AND MEDIA RECOMMENDED FOR FURTHER EVALUATION IN THE BASELINE ECOLOGICAL RISK ASSESSMENT

MEDIA	ASSESSMENT ENDPOINT	CHEMICAL OF POTENTIAL ECOLOGICAL CONCERN
South Area Soil	Direct Toxicity to Soil Invertebrate	4,4'-DDD 4,4'-DDE 4,4'-DDT Aroclor-1254 Barium Chromium Copper Zinc Total HPAH
North Area Soil	Direct Toxicity to Soil Invertebrate	4,4'-DDT Aroclor-1254 Barium Chromium Copper Zinc
Intracoastal Waterway Sediment	Direct Toxicity to Benthic Receptor	4,4'-DDT Acenaphthene Benzo(a)anthracene Chrysene Dibenz(a,h)anthracene Fluoranthene Fluorene Hexachlorobenzene Phenanthrene Pyrene LPAH HPAH Total PAH
Wetlands Sediment	Direct Toxicity to Benthic Receptor	2-Methylnaphthalene 4,4'-DDT Acenaphthene Acenaphthylene Anthracene Arsenic Benzo(a)anthracene Benzo(a)pyrene Benzo(g,h,i)perylene Chrysene Copper Dibenz(a,h)anthracene Endrin Aldehyde Endrin Ketone Fluoranthene Fluorene gamma-Chlordane Indeno(1,2,3-cd)pyrene Lead Nickel Phenanthrene Pyrene Zinc LPAH HPAH Total PAHs
Wetlands Surface Water	Direct Toxicity to Aquatic Invertebrate	Acrolein Copper
Pond Sediment	Direct Toxicity to Benthic Receptor	4,4'-DDT Zinc
Pond Sediment and Surface Water	Food Chain (Ingestion) Effects for the Avian Carnivore (Sandpiper)	Lead
Pond Surface Water	Direct Toxicity to Aquatic Invertebrate	Silver

Notes:
PAH - polynuclear aromatic hydrocarbon
LPAH - low-molecular weight PAH
HPAH - high-molecular weight PAH